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USSR REPORT  
LIFE SCIENCES  
BIOMEDICAL AND BEHAVIORAL SCIENCES

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## AGROTECHNOLOGY

### IMPROVEMENT OF EFFECTIVENESS OF INVENTIONS IN AGROINDUSTRIAL COMPLEX ORGANIZATIONS

Moscow VOPROSY IZOBRETATEL'STVA in Russian No 4, Apr 84 pp 12-15

[Article by V. I. Blinnikov, director of VNIIGPE (All-Union Scientific Research Institute of State Patent Expertise), candidate of engineering sciences (Moscow)]

[Text] Under condition of well-developed socialism, acceleration of scientific and technological progress is aimed at fullest satisfaction of the material and spiritual needs of Soviet people. For this reason, it is not by chance that the matter of inventions, which is in the center of scientific and technological progress, has become a manifestation of creative initiative of scientists, engineers and technicians, leading blue-collar and kolkhoz workers.

Increased effectiveness of inventiveness, better use of spiritual and physical incentives, further improvement of organizational structure and methods of controlling development and use of inventions in the national economy are among the principal issues in further increase in rate and effectiveness of scientific and technological progress.

In order to select out of the many engineering developments the ones that would satisfy the requirements of inventions, patent departments, offices, groups and divisions were established at enterprises, in organizations, design offices and scientific research institutes, and their main task is to find inventions, and assist authors in preparing the paperwork to submit them. Each year, there are about 57,000 consultation centers, which were established under primary, municipal, rayon, oblast, kray and republic-level councils of VOIR [All-Union Society of Inventors and Efficiency Experts], and offer legal and technical aid to inventors.

It should be noted that the vast majority of applications are referable to the last 20 years; the 3-millionth application for an invention was recorded early in 1981. The VNIIGPE experts examine on the average at least 170,000 applications per year. The millionth invention referable to items in the Food Program, the most important objectives of which are the target of creative endeavor of inventors, was recorded in 1982 by the State Scientific and Technical Expertise.

At the present time, enormous opportunities have been provided to solve new, more promising problems in the area of developing invention activities in the nation, including organizations of the agroindustrial complex.



In 1982, there was an appreciable (20%) increase in number of applications for inventions in the main sectors of the agroindustrial complex--agricultural production, which is the source of most essential raw material resources to produce foodstuffs, in sectors of the food industry that are concerned with processing agricultural products, storing and selling them.

Analysis of work on inventions done by organizations of agriculture and the food industry for the last 5 years shows that the rate of submitting applications is different in these sectors.

Thus, in 1982, the number of applications for inventions in the above-mentioned sectors increased by 22% in agricultural sectors as a whole, as compared to 1977, 42% increase being referable to items in the food industry and 32%, in agriculture. It must be stated that agricultural production occupies a central place in the system of the agroindustrial complex; the distinctions of this production are specific, they cannot be reproduced by man on a mass scale and require adaptation to natural conditions. Nevertheless, the rate of agricultural production and its technical armamentarium, with use of inventions, should not lag behind the rate of growth of other sectors of the agroindustrial complex.

Of course, the specifics of agriculture still require in-depth investigation, but one thing is already obvious: the higher the beneficial activity, the more perceptible the results. And, at the present time, there are more than enough topics in agriculture for creative search by inventors, particularly in the area of farming, reduction of harvest losses and mechanization of manual labor. Analysis of highly effective inventions that have been introduced (with a savings of more than 100,000 rubles/year) revealed that inventions referable to agriculture are more cost-effective than inventions in other sectors of the national economy.

The USSR Academy of Sciences and academies of Union republics are involved in development of highly effective inventions in the area of agriculture, together with sector institutions and organizations of the agroindustrial complex, thus integrating scientific research and planning-design work in this area into a single system.

Along with the positive tendencies of invention work in the agroindustrial complex, we should mention that many applications submitted by complex organizations are rejected for both the substance of proposed inventions and because of incorrect paper work. A significant number (up to 20%) of applications for inventions are turned down at the stage of preliminary expert evaluation due to the poor quality of application papers and about 50% due to the findings of scientific and technological experts as failing to be innovative and yield positive effects.

In our opinion, these flaws are related to the performance of developers, level of training of patent workers, disruption of the actual process of finding inventions and preparing applications for work that is on a low technical level, formal attitude toward preparing information about patent studies. The organizations do not always have an objective approach to the submitted conclusions as to novelty, technical-economic effectiveness and possibility of using inventions

in the national economy. Not infrequently, in the race for a large number of applications, there is separation of projects into parts, as a result of which the applications are submitted for minor, unimportant technical projects that are not instrumental in legal protection of complex equipment. For this reason, the effectiveness of such inventions diminishes significantly, as does their informativeness to developers.

In addition, patent research is pursued on a low level at a number of organizations, without proper analysis of technical and patent literature. This is confirmed by the fact that for most applications for inventions, the most frequent reason for negative expertise is absence of novelty, of substantial differences between the items submitted and developments that are already known before the date of submittal of applications, which have been published in the domestic literature and descriptions of inventions in author certificates. Such a situation does not help make effective use of funds allocated by the state for scientific research work, since applications for inventions are among the results of such work. For this reason, it is particularly important at the present time to refine organization of invention work locally, put the patent funds in order and see that they are available for patent research, as well as to raise the sophistication of patent service work, which is particularly important.

A serious flaw in invention-related work of scientific research and design organizations of the agroindustrial complex, which should be aimed at development of basically new equipment and technology, is that in these organizations many technical projects are developed that only upgrade existing equipment, add a new proportion of ingredients in substances, define modes of operations in already known techniques, etc.

As shown by analysis of applications referable to "Grain Harvesting Equipment," "Packaging and Containers for Food and Agricultural Products" and "Storage of Agricultural Products" submitted in 1983, they contained essentially technical developments related to known equipment and pertaining to changes in some units or mechanisms without substantial change in structure of the items.

It should be stated that such inventions are also useful, since it is necessary to update equipment in a way that would preserve the basic and several other of its parts, considering the enormous scale of capital expenditures to renew basic production funds.

However, while we realize the importance of using such inventions, we cannot underestimate the effect of getting ahead with technical ideas that yield only original, basically new inventions, which are steps in scientific and technological progress and, as a whole, advance it to a new, higher level.

One of the most important tasks of national economy planning is to consistently increase the share of new equipment that is developed and used in national production, as noted in the decisions of the 26th CPSU Congress, which inspire scientific workers, engineers and inventors to increase the scale of development, assimilation and introduction of basically new, highly effective equipment that would assure growth of labor productivity, decrease in material and energy consumption, improve the quality of products, increase their competitiveness on the foreign market.

The absence of integrated developments aimed at more efficient use of agricultural production resources, significant increase in labor productivity in the sector, reduction of number of stages in various technological processes and development of continuity of production leads us to conclude that the planning of new developments on the invention level is being done at this time without mutual consideration of different problems on the chain of the entire process, from reaping harvest to delivery of products to the consumer.

One of the most important problems of agriculture is to protect plants against pests, diseases and weeds. At the present time, the low efficacy of mechanical and biological methods of plant protection makes it necessary to use chemicals extensively for protection, i.e., use pesticides in agriculture.

Analysis of author certificates (about 700) issued in 1975-1980 revealed that the main object of developments in organizations is a "substance," i.e., a compound that was chemically produced. However, in spite of the planned increase in capacity to produce chemicals for plant protection, development of new technology for promising pesticides and plant growth regulators, there has been significant reduction in recent years in number of applications for projects dealing with "Pesticides." For example, only 40 applications for inventions were submitted in 1981-1982, and only 22 of them did indeed pertain to inventions.

In the last 4 years, only 84 applications for inventions referable to "Plant Growth Regulators" were submitted by 66 organizations, which is also evidence of minimal work on inventions.

Analysis of applications related to items in the Food Program, which was made at the VNIIGPE in the first 6 months of 1983 for 29 major directions summarizing applications received in all expert departments revealed that the directions of the Food Program related to increasing livestock product output and storage of agricultural products were supplied the most with application documents. There were few (1-3% of all applications received) applications pertaining to some directions of work. No applications at all were submitted on the topics of "Power Stations for Agriculture," "Development of Antifriction Building Materials" and "Pumps and Compressors for Agriculture."

At the present time, acceleration of use of inventions is the deciding factor in improving the efficiency of national production. For this reason, special attention should be devoted to validation of technical-economical effectiveness of inventions at the stage of scientific-engineering developments and preparation of applications. A positive effect from the proposed technical item is one of the most important criteria to deem it an invention.

The results of scientific and technical expertise of the applications examined, which were related to items in the Food Program, revealed that many of those recognized as inventions were concerned with the following technical areas:

Technology and equipment for production of biologically high-grade products on the basis of using traditional and new types of raw materials, including waste-free and minimal-waste technological processes.

Machinery and equipment for cultivating agricultural products and harvesting them.

Production of all types of feed.

Protection of plants against pests, diseases and weeds; use of chemical protective agents.

Methods of reproducing farm animals.

Assimilation of production of commercial fish, invertebrates and algae.

Fertilizer production.

What then is the situation as to introduction of these inventions? Analysis of the "Introduced Inventions" collection for 1980-1982 (according to years of initial introduction) revealed that only 35% of all introduced inventions yielded an economic effect, whereas such an effect was not indicated for the rest of the used inventions.

The largest number of introduced inventions is referable to farming and production of foodstuffs; they account for more than 50% of the inventions. The introduced inventions related to progressive technology and equipment for production of biologically high-quality items constitute more than 30%. From 6 to 8% of the inventions are in the direction of increasing effectiveness of livestock and commercial fish farming. However, half the directions in the Food Program are either without inventions introduced into practice, or very inadequately supplied with them.

Apparently, it is no accident that such a situation exists. The fact that not a single highly effective invention aimed at solving the main problems of the Food Program was made in recent years at some leading organizations, such as the All-Union Scientific Research and Planning-Design Institute of the Refrigeration Industry, the Gidrolizprom [Hydrolysis Industry] Scientific Production Association, Pishchepromavtomatika [Food Industry Automation], All-Union Scientific Research Institute of Biotechnology and Complex Scientific Production Association, is not in last place as the cause of this situation.

Analysis of the performance of some enterprises of the food industry revealed that the work plan of these organizations contains many items that are not, in essence, scientific. They can be viewed as technical assistance rendered to enterprises. These are primarily items related to development of standards, data on scientific organization of labor, standards, etc. The plans for scientific research and experimental design work at the organizations include many minor topics, for which reason the scientific and technological level of the plans drops, there are fewer promising projects, on the basis of which one could plan an invention.

Such a situation was found in organizations of VNIIMP [All-Union Scientific Research Institute of the Meat Industry], VNIMI [All-Union Scientific Research Institute of the Dairy Industry], VNIITikhodprom [All-Union Scientific

Research Technological Institute of the Refrigeration Industry] and Special Design Office of the Automated Control System of the Meat and Dairy Industry, where expenses for scientific research have increased.

To this day, several scientific research institutes and design offices of the agroindustrial complex continue to develop equipment based on obsolete inventions, so that it can be considered new only because of the date it was produced. Hence the minimal patenting activity pertaining to new developments and minimal results of selling licenses abroad.

Analysis of introduction of inventions in sectors of the agroindustrial complex also revealed another rather important factor. We refer to introduction dates. It should be noted that, as of today, these dates are quite extended for different inventions, ranging from 1 to 20 years.

As we know, most applied research, including that performed on the level of inventions, loses its novelty after 3-7 years. At the same time, the period of development of experimental prototypes is very long, 8-10 years, in several sectors of the agroindustrial complex. The effect of the time factor is often deciding with respect to end indicators of effectiveness of scientific and technological progress.

At present it is growing necessary to investigate each phase of the complex process of development and introduction of inventions, determination of deciding factors in this process and their significance. Such factors must be evaluated, and they should be used to determine the reserves for increasing effectiveness of work on inventions by enterprises and organizations of the agroindustrial complex.

For example, organizational and economic factors include planning (including work on patents and inventions), financing, material incentives (for inventors, developers instrumental in introduction and implementing it, patent workers), supply, status of personnel work and level of their qualifications (developers, researchers, patent workers). Technical production conditions in a given facility (presence and technical support of experimental and testing base) are also among important factors.

In addition, it is necessary to take into consideration the integrated nature of problem solving, degree of novelty and category of complexity of the item being developed, scientific organization of labor and information back-up for developers.

In-depth analysis of the above-mentioned factors is necessary to solve important problems aimed at furnishing the agroindustrial complex with machinery, equipment, instruments and materials that are on a par with worldwide achievements in their technical and economic indicators, in order to develop and introduce basically new equipment and technology, as stipulated in the decree of the CPSU Central Committee and USSR Council of Ministers, "On measures to accelerate scientific and technological progress in the national economy."

Performance of such work in sectors of the agroindustrial complex will increase the effectiveness of work on inventions in these sectors and cause it to conform to the objectives spelled out in the decisions of the May (1982) and subsequent Plenums of the CPSU Central Committee

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CSO: 1840/1029

EFFECTIVENESS OF CALCIUM POLYPHOSPHATE OBTAINED BY LOW-TEMPERATURE METHOD

Moscow AGROKHIMIYA in Russian No 2, Feb 84 (manuscript received 21 Mar 83)  
pp 15-21

OSTANIN, A. I., NEUGODOVA, O. V., BEZUGLAYA, Yu. M., KASITSKIY, Yu. I.,  
BORONINA, I. A. and SURIKOVA, O. N., Scientific Institute of Fertilizers  
and Insectofungicides, Moscow

[Abstract] A low-temperature method was employed for the preparation of calcium polyphosphate from the Karatau phosphorites, which consisted of decomposition of the phosphorite with a sulfuric acid-phosphoric acid mixture and heating of the reaction mixture to 300°C for phosphate decomposition and dehydration. The resultant fertilizer contained 40-60 percent water-soluble  $P_2O_5$ , with more than 60% of the phosphorus found in the  $CaH_2P_2O_7$  and  $MgH_2P_2O_7$  polyform. Testing on leached dernovo-podzolic soils for the cultivation of corn, oats, winterwheat, barley, etc., demonstrated that the low-temperature fertilizer was equivalent to double superphosphate, was more effective than double superphosphate on sierozem soil, but inferior on chernozem. Evaluation of grain production and trace element balance of crops indicated that the low-temperature calcium polyphosphate fertilizer was superior to double superphosphate and calcium polyphosphate prepared by other methods. References 7 (Russian).

[1038-12172]

EFFECTS OF PHOSPHORUS FERTILIZER FORM ON PRODUCTIVITY OF CROP ROTATION AND  
CHERNOZEM PHOSPHATE BALANCE

Moscow AGROKHIMIYA in Russian No 2, Feb 84 (manuscript received 25 Apr 83)  
pp 22-26

BORONIN, N. K. and BORONINA, I. I., Grakovskoye Experimental Field, Scientific Institute of Fertilizers and Insectofungicides, Kharkov Oblast

[Abstract] An evaluation was made of the effects of form of phosphorus fertilizer on the productivity of crop rotation and Ukrainian chernozem phosphate balance. The studies, which commenced in 1967 and were continued for 12 years, showed that an annual addition of 60 kg/ha of phosphorus fertilizers increased the concentration of mobile (water-soluble) phosphates from 7.5-8.5 mg/100 g of soil to 11-12 mg  $P_2O_5$ /100 g of soil. Crop rotation with corn (green fodder)-winter wheat-sugar beets-corn (silage) and use of N60P60K60, N90P60K60 and N120P60K60 for each rotation resulted in a phosphate level which was optimal for winter wheat and sugar beets without irrigation, but quite inadequate on irrigated fields. The phosphate balance resulting from the introduction of the fertilizers showed an increase in the concentration of iron and aluminum phosphates, and a reduction in the calcium and magnesium phosphates.

[1038-12172]

MINERAL NUTRITION OF IRRIGATED CORN FERTILIZED TO YIELD TARGETED HARVESTS IN  
UKRAINIAN STEPPE

Moscow AGROKHIMIYA in Russian No 2, Feb 84 (manuscript received 1 Feb 83)  
pp 34-37

KUNITSA, V. M., All-Union Corn Scientific Research Institute, Dnepropetrovsk

[Abstract] Studies conducted in the period 1974-1978 were designed to test the effects of mineral fertilizers applied in quantities intended to give the planned corn harvest in irrigated Ukrainian steppes on mineral utilization. To obtain harvests of 100 centners/ha N199-257P40-180K0-100 fertilizer was used, and for planned harvests of 120 centners/ha N140-202P120-260K93-183 fertilizers were employed. Results presented in tabular form show that target harvests could be obtained by employing the appropriate fertilizer mixture. At the designated harvests the mineral uptake by the various varieties of corn was essentially identical and amounted to 52.8 percent of the applied nitrogen, 21.4 percent of the phosphorus and 62.6 percent of the potassium. The agrochemical constants are summarized in tabular form and can be used to estimate mineral fertilizer requirements for corn in the Ukrainian steppe, using similar conditions of cultivation.

[1038-12172]

## ROOTS AS BIOINDICATORS OF SOIL POLLUTION WITH TOXIC ELEMENTS

Moscow AGROKHIMIYA in Russian Vol 2, Feb 84 (manuscript received 23 Mar 83)  
pp 73-77

VAZHENIN, I. G., Soil Institute imeni V. V. Dokuchayev, Moscow

[Abstract] Evaluation was made of roots as bioindicators of soil pollution with heavy metals (Mn, Zn, Cu, Ni, Pb, Sr, etc.), by analyzing the metal concentration in the roots, leaves and seeds of wild grassy plants growing at a distance of 1.5-2.5 km from metallurgical plants and correlating the findings with soil levels of these elements. The results showed that the coefficient of accumulation of the metals for roots and seeds (i.e., root:seed) ranged from 35 (for iron) to 5-6 (Zn, Cu), and suggested that analysis of the roots suffices for estimation of the degree of plant-life pollution. The degree of metal accumulation in the root systems of the grassy plants was inversely proportional to the capacity of the soil for uptake and retention of the metal pollutants. Analysis of the roots rather than the soil offers the advantage in that the assimilative capacity of the plants for a given metal is also reflected in the analysis. References 4 (Russian).

[1038-12172]

UDC 631.81.095.337:633.11

## TRACE ELEMENT CONCENTRATION IN NUTRITIVE MIXTURES FOR WHEAT CULTIVATION

Moscow AGROKHIMIYA in Russian No 2, Feb 84 (manuscript received 13 Jul 82)  
pp 78-86

TREYMAN, A. A., IPA [expansion unknown], Siberian Department, USSR Academy of Sciences, Novosibirsk

[Abstract] An analysis was made of the trace element requirements for optimum wheat growth under sand cultivation, using Knop's mixture and similar nutrient preparations. Evaluation of the trace element balance of the plants showed that not all nutrient mixtures meet the requirements for optimum growth and development of wheat, and that generally there is a deficiency of Mn, Zn and Cu. Having calculated the amount of Fe, Mn, Zn, Cu, B and Mo required for the formation of 1 gram of seeds, the recommendation was made that the following balance of supplements be added in the quantities specified (mg/kg sand) to the nutrient mixtures: 3 mg Fe, 1 mg Mn, 0.7 mg Zn, 0.06 mg Cu, 0.12 mg B and 0.018 mg Mo. References 20: 16 Russian, 4 Western.

[1038-12172]



## USING REGRESSION ANALYSIS TO EVALUATE HERBICIDE BEHAVIOR IN SOIL

Moscow AGROKHIMIYA in Russian No 2, Feb 84 (manuscript received 16 Feb 83)  
pp 92-97

SHABANOV, A. K., SPIRIDONOV, Yu. Ya. and SHESTAKOV, V. G., All-Union  
Scientific Research Institute of Phytopathology, Moscow Oblast

[Abstract] Standard criteria of regression analysis were used to evaluate the behavior of herbicides in soil, using studies with picloram as a model. The fundamental criterion dealt with picloram adsorption to soil particles as being the single most important factor determining the fate of the herbicide in the soil prior to plant uptake and other forms of degradation. The excellent agreement between experimentally determined points and equations derived for the straight line by regression analysis indicate the utility of the latter approach, in which a standard differential equation for concentration vs. time can be used to determine the degradation constant. Figures 1; references 15: 11 Russian, 4 Western.  
[1038-12172]

UDC 633.16:632.954+632.951

## EFFECTS OF SYSTEMATIC APPLICATION OF BAZAGRAN AND BAZAGRAN-INSECTICIDE MIXTURES ON BARLEY

Moscow AGROKHIMIYA in Russian No 2, Feb 84 (manuscript received 9 Mar 83)  
pp 98-102

PRISHCHEPA, I. A., Belorussian Scientific Research Institute of Plant Protection, Priluki, Minsk Oblast

[Abstract] The entire scope of barley dynamics was evaluated in relation to the use of the herbicide bazagran and bazagran-insecticide combinations. The results showed that usage of bazagran alone in standard, acceptable quantities had no effect on barley yield or quality, while combinations with insecticides (fozalone, bazudin) had negative effects on harvests and plant quality (with grain production decreased by 19 percent with phozalone and by 29 percent in the combination with bazudin). However, the herbicide-insecticide combinations did not induce genetic damage to the barley plants. References 21 (Russian). [1038-12172]

GENETIC PRINCIPLES FOR INCREASING CROSSABILITY OF BREAD WHEAT (TRITICUM AESTIVUM L.) WITH CULTIVATED RYE (SECALE CEREALE L.) REPORT II. INHERITANCE OF CROSSABILITY OF WHEAT AND RYE

Moscow GENETIKA in Russian Vol 19, No 12, Dec 83 (manuscript received 25 Jan 83) pp 2044-2049

GORDEY, I. A. and GORDEY, G. M., Belorussian Scientific Research Institute of Agriculture, Minsk Oblast

[Abstract] Principles of inheritance by bread wheat of crossability with cultivated rye are discussed and a genetic method of increasing compatibility of these grains is substantiated experimentally. Study of inheritance of crossability with diploid spring Somro rye (RR,  $2n=14$ ) in ( $F_1$ - $F_3$ ) hybrids of bread wheat (AABBDD,  $2n=42$ ) was described. Low crossability with appearance of the effect of heterosis in some combinations predominates in  $F_1$ . High crossability of wheat and rye is a recessive character and is controlled by at least two genes with different degree of expressability. References 13: 8 Russian; 5 Western.  
[535-2791]

UDC: 581.1:632.42:633.11

INFLUENCE OF BROWN RUST INFESTATION ON PHOTOPHOSPHORYLATION OF WINTER WHEAT

Moscow BIOLOGICHESKIYE NAUKI in Russian No 12, Dec 83 (manuscript received 15 Jan 82) pp 80-83

VORONKOV, L. A., GORDIYENKO, T. K. and PERESYPKIN, V. F., Moscow State University

[Abstract] A study was made of the influence of brown rust infection on processes of energy storage in the chloroplasts of winter wheat in varieties with different levels of resistance. Experiments were performed on plants of two types, one susceptible to brown leaf rust, one immune under field conditions. The intensity of photophosphorylation was judged in infected plant leaf samples from the excess of inorganic phosphate obtained upon illumination of a reaction mixture containing the plant leaf as specimens, 60  $\mu$ M NaCl, 10  $\mu$ M  $MgCl_2$ , 10  $\mu$ M  $KH_2PO_4$ , 10  $\mu$ M ADP, 0.1  $\mu$ M phenazine methosulfate and a suspension of chloroplasts, pH 7.8. The results showed that sprouts from nonvernalized seeds of the susceptible variety as well as the immune variety grew identically with artificial infection with brown leaf rust. Some differences in activity of the reaction of synthesis of ADP were observed in wheat varieties of different resistances. A higher level of cyclic and noncyclic photophosphorylation was observed in the immune variety, particularly in experiments with vernalized sprouts. The pathogen significantly decreases the functional activity of the photosynthetic apparatus of the chloroplasts in the susceptible variety, while practically not changing it in the immune variety. References 9: 4 Russian, 5 Western.  
[551-6508]

UDC 577.152.351

PROPERTIES OF UREASE IMMOBILIZED ON SILOCHROME WITH AID OF DISULFIDE BONDS

Kiev UKRAINSKIY BIOKHMICHESKIY ZHURNAL in Russian Vol 56, No 1, Jan-Feb 84  
(manuscript received 3 Mar 83) pp 24-27

LYUBINSKIY, G. V., YANISHPOL'SKIY, V. V., TERTYKH, V. A., YUODVAL'KITE, D. Yu. and GLEMZHA, A. A., Institute of Physical Chemistry imeni A. V. Pisarzhevskiy, UkSSR, Kiev; All-Union Scientific Research Institute of Applied Enzymology of the Main Administration, Microbiological Industry, USSR Council of Ministers, Vil'nyus

[Abstract] Production and some properties of urease of microbial origin, immobilized on silochrome with grafted sulhydryl groups activated by Ellman's reagent (2,2'-dithiobis-p-nitrobenzoic acid) are described. SH-groups were grafted to the surface of silicas via the hydrolytically stable Si-C bond with the aid of gamma-mercaptopropyltrimethoxysilane. Properties of the preparations obtained were studied and discussed.  $K_m$  of the urease was not changed significantly during nonporous silicon aerosil immobilization. Study of activity of urease, immobilized on 3 silochrome samples with various mean particle diameter, as the function of the quantity of binding enzyme showed that this dependence deviates from linearity with the increase of carrier particle diameter. This deviation from linearity may be explained by diffusion inhibition for the substrate and reaction products, occurring in spite of the fact that the urea concentration exceeds the  $K_m$  by an order of magnitude of 2. Figures 2; references 12: 5 Russian, 7 Western.  
[547-2791]

UDC 557.113.3+577.152.4+577.152.31:612.74

EFFECT OF IMMOBILIZED ADRENALIN ON STATE OF ADENYLATE CYCLASE SYSTEM OF RAT CARDIAC AND SKELETAL MUSCLES IN RECOVERY PERIOD AFTER PHYSICAL EXERCISE

Kiev UKRAINSKIY BIOKHMICHESKIY ZHURNAL in Russian Vol 56, No 1, Jan-Feb 84 (manuscript received 3 May 83) pp 52-57

KALINSKIY, M. I., KOTSYURUBA, V. N., KHALMURADOV, A. G., GUBKINA, N. I. and BALAKLEYEVSKIY, Kiev Institute of Physical Culture; Institute of Biochemistry imeni A. V. Palladin, UkSSR Academy of Sciences, Kiev; Medical Institute, Minsk

[Abstract] Change of cAMP level and adenylate cyclase and phosphodiesterase activity in rat cardiac and skeletal muscle at various periods of recovery after one prolonged physical exercise session is described and discussed. Directional correction of cAMP metabolism in heart and skeletal muscle was attempted by subcutaneous injection of 30 µg of adrenalin-base/ 1 kg of live weight of rats, 24 hours before start of physical exercise. Physical exercise had the same effect on adenylate cyclase activity and AMP level in both control and experimental animals, producing reduction of these indicators immediately after completion of exercise. Adenylate cyclase activity and cAMP level are normalized within 2-3 hours after exercise in myocardium of experimental rats while muscle activity depresses adenylate cyclase activity and cAMP level in control animals for 36 and 24 hours respectively. These indicators are normalized in the myocardium of experimental rats within 1 hour after exercise. Immobilized adrenalin did not affect phosphodiesterase activity in rat cardiac or skeletal muscle under conditions of the experiment. Figures 2; references 20: 14 Russian, 6 Western. [547-2791]

UDC 615.355:577.152.431].012.8.002.62:615.262.2:547.495.8].012.1

ENZYMATIC TRANSFORMATION OF L-HISTIDINE INTO UROKANINIC ACID BY MEANS OF IMMOBILIZED HISTIDASE FROM RAT LIVER TISSUE

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian No 6, Nov-Dec 83 (manuscript received 13 Dec 82) pp 76-79

KOZLOV, Ye. A., PETRIY, O. P., BUROBIN, V. A. and FEDOROV, S. A., Scientific Research Institute of Medical Enzymology, USSR Academy of Medical Sciences, Moscow; Department of Biochemistry, I Moscow Medical Institute imeni I. M. Sechenov

[Abstract] Experimental results were reported on synthesis of rat liver histidase preparations chemically bound to aminoethylcellulose (AEC) activated by glutaryl aldehyde and polyacrylamide. Principal kinetic parameters, stability of AEC-immobilized enzyme and its use in synthesis of urokaninic acid from histidine were also studied. The immobilized

histidase retained its activity when stored in water at 5° C for 6 months; the free enzyme lost its activity completely in a week under such circumstances. The enzyme was also found to be stable on a column, retaining its activity for 40 days at 39° C. Immobilized histidase could be effectively used for enzymatic synthesis of urokaninic acid from histidine. Figures 3; references 15: 4 Russian, 11 Western.  
[581-7813]

UDC 547.963.32

#### CHEMICAL MODIFICATION OF DOUBLE-STRANDED DNA IN STUDYING INDIVIDUAL BASE PAIR EXPOSURE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 6, Feb 84 (manuscript received 27 Dec 83) pp 1508-1510

SVERDLOV, Ye. D. and KALININA, N. F., Institute of Bioorganic Chemistry imeni A. A. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] A discussion is presented of the use of various chemicals for the selective reaction with, or modification of, certain bases in double-stranded DNA molecules, using such results as proof for the contention that not all bases are equally exposed on the surface of the DNA molecule. Consequently, protein-DNA interactions can similarly be expected to involve the reaction of only certain bases with the various chemical groups on proteins, while bases that are located within crevices or shielded in some other manner would not be expected to react. A review of certain chemicals has shown that, indeed, hydrogen peroxide, nitrous acid, or N-bromosuccinimide and sodium borohydride react more readily with single-stranded DNA molecules than with the double-stranded species. Further, reaction with certain bases has been shown to be predicated on the presence of adjacent bases which may hinder such reactions, i.e., the sequence in which a base is located determines whether it reacts with a chemical because of its relative degree of accessibility. Figures 3; references 10: 1 Russian, 9 Western.  
[548-12172]

UDC 577.352.26

PROTON EQUILIBRIUM IN BILAYER LIPID MEMBRANES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 5, Feb 84 (manuscript received 30 Jun 83) pp 1226-1229

MATINYAN, N. S. and ABIDOR, I. G., Institute of Electrochemistry, USSR Academy of Sciences, Moscow

[Abstract] Bilayer lipid membranes were employed in a study designed to assess proton equilibrium between the polar portions of proteins and lipids in biological membranes, on the one hand, and the surrounding medium. Calculations and electrical measurements made on lipid membranes constructed of zwitterions such as phosphatidylcholine, phosphatidylethanolamine, cholesterol, phosphatidyl serine, phosphatidylinositol, phosphatidic acid and their mixtures, as well as soybean lipids (azolectin) in  $10^{-3}$  M KCl showed that, in general, the Stern equation gave an adequate description of proton equilibrium status. An important criterion in the comparison of experimental results and theoretical calculations of  $\Delta E(\text{pH})$  was constancy of the dipole potential. The latter, however, is not always invariant and shifts in proton equilibrium lead to changes in the dipole potential. Figures 3; references 8: 5 Russian, 3 Western.  
[571-12172]

UDC 541.64:546.26+576.8.097.3:612.1

PREPARATION OF BIOSPECIFIC MATERIALS FROM BIOCOMPATIBLE CARBONACEOUS CARRIERS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 5, Feb 84 (manuscript received 18 Jul 83) pp 1236-1238

STRELKO, V. V., MIKHALOVSKIY, S. V., SUKHARENKO, N. V., KARTEL', DAVYDOV, V. I. and NOSKOV, A. M., Institute of General and Inorganic Chemistry, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] A summary is presented of the more recent studies on using the carbonaceous hemosorbent SKN for the preparation of biospecific, hemocompatible

reagents. The general approach consisted of the modification of the hemosorbent surface by the introduction of a variety of functional groups (-COOH, -COCl, -NH<sub>2</sub>, -N=N-, -NCO) capable of immobilizing biomolecules. Subsequent treatment of such modified hemosorbents with bifunctional agents and protein solutions led to the desired reagents. Such reagents have been found to retain stability and activity for long periods of time and to offer simplicity in certain biochemical operations. For example, thrombin conjugated to the hemosorbent retained 50% of its activity for ca. 3 months, while rabbit anti-human IgG antibody bound to the hemosorbent showed absolute specificity in immunoadsorption of human IgG from blood specimens. Similarly, conjugated urease and nuclease retained their specific enzymatic activities for periods of several months. Figures 1; references 6: 2 Russian, 4 Western.  
[571-12172]

#### MECHANISMS OF PHOTODAMAGE TO EYE STRUCTURE. EFFECT OF ULTRAVIOLET RAYS ON SOLUBLE CRYSTALLINE LENS PROTEINS

Moscow BIOFIZIKA in Russian Vol 28, No 6 Nov-Dec 83 (manuscript received 28 Jun 82, after revision 21 Feb 83) pp 966-971

KORKHMAZYAN, M. M., FEDOROVICH, I. B. and OSTROVSKIY, M. A., Institute of Chemical Physics, USSR Academy of Sciences, Moscow; Yerevan Physics Institute

[Abstract] The light-receptive parts of the eye have components with varying coloration, and photolysis of light-sensitive vision pigments are a key process in vision. Since damage to these eye components in the form of cataracts poses a serious problem, the authors have studied the effects of UV light on soluble proteins of the crystalline lens of bulls by isolating and homogenizing them, eliminating insoluble parts and irradiating the remaining solutions under aerobic conditions. Then various tests such as protein concentration, sulfhydryl content determination, reduction of S-S bonds and electrophoresis, were conducted. Results indicated that during photodamage of crystalline lens proteins, oxidation of SH-groups and changes in their conformation take place. Polypeptide chains with molecular weights of 19-23,000 formed covalent cross-links, leading to clouding of the lens, as well as light-induced yellowing. Figures 4; references 11: 2 Russian, 9 Western.  
[578-12131]

## ANALYSIS OF COMPLEX-FORMATION BETWEEN LIGANDS AND BINDING SITES BY METHOD OF IMITATION MODELING

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 6, Feb 84 (manuscript received 9 Aug 83) pp 1494-1497

KUROCHKIN, I. N., GROMOV, A. I., BLAGOVESHCHENSKIY, Yu. N., ZAYTSEV, S. V., VARFOLOMEYEV, S. D. and BEREZIN, I. V., corresponding member, USSR Academy of Sciences, Moscow State University imeni M. V. Lomonosov

[Abstract] Consideration is given to the analysis of binding data between a ligand and binding sites, on the basis of the standard binding curves and dissociation constants derived from the law of mass action. The proposed approach relies on analyzing the variable parameters of binding by the method of least squares with the assumption that errors follow a normal distribution and are independent from one binding experiment to another. The key data plot for evaluative studies is based on the relationship between bound ligand and total binding sites expressed as  $[B] = \frac{[Q][L]}{K_d + [L]}$ , where  $[B]$  is

the concentration of the bound ligand,  $[Q]$  the total concentration of binding sites,  $[L]$  the equilibrium concentration of the free ligand and  $K_d$  the dissociation constant. Figures 3; references 3: 2 Russian, 1 Western.

[548-12172]

## ANTICIPATION TIME FOR DISORDERED-ORDERED TRANSITION IN PREBIOLOGIC EVOLUTION AS PHYSICAL CRITERION FOR ORIGIN OF LIFE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 6, Feb 84 (manuscript received 14 Nov 83) pp 1497-1500

MOROZOV, L. L., KUZ'MIN, V. V. and GOL'DANSKIY, V. I., academician, Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] Mathematical basis is provided for the relevance of anticipation time for disorder-order transition as a prerequisite for the origin of life. This follows from the arguments that the early biosphere represents the formation of a more ordered state from the existing chaotic abiotic state as a result of the loss of stability of the latter system. The prebiotic state, then, is predicated on such parameters as temperature, density, etc., i.e., factors which lend themselves to physical analysis and, therefore, estimation of the time required for sufficient order to be formed as the stability of the existing chaotic system deteriorates. Comparison of the anticipation time with the existence time of a cosmic object may serve as a basis for deriving quantitative estimates for the probability of life occurring on the cosmic object in question. Figures 1; references 5:

3 Russian, 2 Western.

[548-12172]



## BIOTECHNOLOGY

### PROBLEMS IN CHLORELLA PRODUCTION IN UZBEKISTAN

Tashkent EKONOMIKA I ZHIZN' in Russian No 11, Nov 83 pp 16-20

REZNIKOVA, L.

[Abstract] A brief survey is presented of the cultivation of chlorella for use as feed additive and source of valuable biological products, particularly the development of this branch of science and technology in Uzbekistan. Although scientists in Uzbekistan were among the first to harness chlorella and show its potential in agriculture, large-scale production has not been successful despite the construction of some 500 facilities. This has largely been due to mismanagement on the part of the Uzbek SSR Ministry of Agriculture in neglecting basic and applied research, despite warning from the Institute of Microbiology of the Uzbek SSR Academy of Sciences. Currently, steps are being taken to remedy this situation of neglect and indifference on the part of the agricultural ministry, and to encourage further studies on safety testing of chlorella products and expansion of their application. Figures 2.  
[545-12172]

ECOLOGY

UDC: 581.19.199:54-39:547.915.5

COMPLEX RESISTANCE OF PLANTS TO CHEMICAL ENVIRONMENTAL CONTAMINATION

Sverdlovsk EKOLOGIYA in Russian No 1, Jan-Feb 84 (manuscript received 5 Oct 82) pp 62-63

PASHCHENKO, V. N., All-Union Scientific Research Institute of Protection of Nature and National Forest Management

[Abstract] A definition is presented of the combined resistance (or K-resistance) of plants to chemical pollution. Noting that both wild plants and selected agricultural crops are heterogeneous populations, the authors defined K-resistance as an adaptive process in which the population as well as its individual members adapt to environmental factors, including pollution, as a result of which the plants can continue to grow in toxic media without significant decrease in height, yield or regeneration capacity. Resistance is developed both by changing the population and by changing the functions and structures of the organism which actualize the capabilities of the plant to adapt to the toxic environment. The genetic richness or population capacity of a variety essentially determines its resistance. References 8 (Russian). [1030-6508]

UDC: 578.088.91:581.5

SPECIFICS OF INCLUSION AND DISCRIMINATION OF TRITIUM IN PLANTS

Sverdlovsk EKOLOGIYA in Russian No 1, Jan-Feb 84 (manuscript received 29 Apr 83) pp 66-68

SYROVATKO, V. A. and ANTONENKO, T. M., Scientific Research Institute of Biology, Dnepropetrovsk State University

[Abstract] A study is presented of the specifics of inclusion of tritium in easily metabolized and firmly bonded forms of certain organic compounds in plants. Studies were performed with vegetating Saratovskaya-29 spring wheat grown in soil culture and irrigated with water containing 20 nC/ml

tritium. Specimens of straw were agitated for 2 hours in a 0.2 n solution of HCl to remove the easily metabolized tritium before determining the firmly bonded tritium. The specimens were washed in distilled water and dried at 105°C to constant weight. It was found that there was little difference in the distribution coefficient of tritium among hydrogen in water and easily metabolized organic compounds of the plants, indicating near uniform equilibrium distribution. References 6: 5 Russian, 1 Western.  
[1030-6508]

UDC 616.936-084.4

BASIC POSITIONS OF PROJECTED COMPREHENSIVE MALARIA CONTROL PROGRAM

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 83 (manuscript received 12 Feb 83) pp 3-7

KUZNETSOV, R. L., BOGATYREV, O. F., KONDRASHIN, A. V., MOISEYEV, V. P., ANUFRIYEVA, V. N. and MAKIYENKO, N. I., Institute of Medical Parasitology and Tropical Diseases imeni Ye. M. Martsinovskiy, USSR Ministry of Health

[Abstract] After outlining control and eradication of malaria on Soviet territory by 1960, the authors note that carriers of malaria from Asia and Africa have reintroduced the disease in isolated ways. In addition, the USSR's role in aiding other countries to eliminate malaria is stressed. Emphasis has been placed on identifying possible remaining or revived malaria locations and improving prophylactic measures, especially for Soviet citizens travelling to Africa and Asia. The special comprehensive program "Malaria and its Control" planned for 1983-1990 includes all the above approaches. Further details include preparation of a unified map of malaria sites throughout the USSR, evaluation of this information and development of algorithms of the epidemic process for various types of sites. Improvements in serology can also help in eradicating the disease. Analysis of information from world malaria epidemics, particularly in lands where Soviet specialists work, such as South-East Asia, and development of effective medications, offer added objectives. Special attention will be devoted to southern parts of the USSR, where irrigation facilities offer habitat to malaria transmitters. Chloroquin-resistant strains of the pathogen in South-East Asia require new control agents. The Soviet research agencies involved in the program are cited. References 9 (Russian). [557-12131]

CASES OF QUARTAN MALARIA AFTER BLOOD TRANSFUSIONS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 83 (manuscript received 13 Sep 82) pp 7-9

PIRUMOV, Kh. N., KAZANYAN, S. M. and BALASANYAN, M. A., Republic Sanepid Station of the Armenian SSR, Yerevan

[Abstract] During the battle against quartan malaria, it was widespread in the Soviet Armenia, but by 1926 it was being effectively identified in blood and by 1949, it was essentially eliminated. In the period 1967-1980, seven cases of malaria infection through blood transfusions were recorded. The present article traces the blood donors and course of the disease in the affected patients. The first diagnoses were generally angina or other diseases with symptoms like malaria. In all cases, donors had suffered from malaria, but usually the exact type had not been identified. They had had the disease more than 30 years prior to the blood donation incidents.

References 2 (Russian).

[557-12131]

IMPORTANCE OF IMMUNODIAGNOSTICS IN STUDYING SPREAD OF QUARTAN MALARIA

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 83 (manuscript received 5 Mar 83) pp 10-14

GLAZUNOVA, Z. I., GORBUNOVA, Yu. P., KRAYNOVA, L. A. and SIVOSHINSKAYA, P. B., Chair of Tropical Diseases, Central Order of Lenin Institute for Advanced Training of Physicians, Moscow

[Abstract] Major research is needed on the connection between the human body and Plasmodium malariae, which can remain unnoticed in human blood for extended periods before causing distress. The present article reports on studies of immunofluorescent-reaction methodology using 514 subjects from around the world. The authors sought to determine the function of antibodies to P. malariae. Subjects from tropical Africa were regarded as especially suitable, since conditions in their countries are favorable for human malaria pathogens. Of the 514 subjects, malaria parasites were found in 48, with 7 instances of P. malariae, 25 of P. falciparum, 10 of P. vivax and 6 cases of P. ovale. The immunofluorescent reaction test was positive for P. malariae or P. falciparum in high titers with homologous antigens, and for P. vivax or P. ovale in low titers only with P. falciparum antigens; negative reactions were noted with the P. brasilianum antigen. Data indicate that the quartan malaria pathogen has a wider range throughout the world than previously believed. Part of the antibodies to P. malariae have a protective effect by keeping parasitemia at low levels. Symptom-free

carriers of *P. malariae* require further study. References 28: 4 Russian, 24 Western.  
[557-12131]

UDC 616.936-078.73

RESULTS OF STUDY OF MALARIA VICTIMS BY IMMUNOFLUORESCENCE WITH HOMOLOGOUS AND HETEROLOGOUS ANTIGENS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 83 (manuscript received 5 Mar 83) pp 14-16

ALEKSEYEVA, M. I., GLAZUNOVA, Z. I., GORBUNOVA, Yu. P. and PAVLOVA, Ye. A., Chair of Tropical Diseases, Central Order of Lenin Institute for Advanced Training of Physicians, Moscow

[Abstract] The usual parasitological approach to diagnosing malaria can be rendered ineffective by anti-malarial medications. In such cases, immunofluorescent procedures are an effective complement or replacement for diagnosis. The present article reports on study of 60 subjects, of whom 20 were Soviet citizens who had contracted malaria abroad. Some 35 of the subjects suffered from *P. falciparum*, *P. malariae* or *P. ovale*, with but 5 victims of *P. vivax*. Parasitological study showed tropical forms of malaria, but the above appeared much less often. In immunofluorescence tests, 23 of 26 subjects tested were shown to have *P. falciparum* (17), *P. malariae* (4) or *P. vivax* (7). The method is particularly useful when diagnosis has not otherwise been established; nevertheless, a negative immunofluorescence test does not rule out malaria, and further testing must be conducted.

References 9: 1 Russian, 8 Western.  
[557-12131]

UDC 576.893.192.6.04:615.283.926

RESULTS OF IN VIVO AND IN VITRO STUDY OF SENSITIVITY OF IMPORTED STRAINS OF *P. FALCIPARUM* TO CHLOROQUIN

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 83 (manuscript received 23 Nov 82) pp 17-21

LYSENKO, A. Ya., GORBUNOVA, Yu. P. and KARELINA, L. A., Chair of Tropical Diseases, Central Order of Lenin Institute for Post-Doctoral Study of Physicians

[Abstract] Developing resistance to typical pesticides has been noted in malaria parasites since the early 1950's. Since more than 100 cases of imported malaria are recorded annually in the USSR, the authors studied the course of such diseases in, for example, a Namibian who arrived in the USSR

in 1981, and hypothesized resistance to delagil. Beginning in 1982, they studied sensitivity to chloroquin in *P. falciparum*, following criteria of the World Health Organization. Detailed study of six foreign malaria-victims in vivo and in vitro showed parasitemia levels from 3,780 to 32,416 per mcl; these levels were gradually reduced in five patients. All three strains of *P. falciparum* imported from Tanzania were found to be resistant to chloroquin. Hence, new approaches to controlling such strains in the Soviet Union must be developed. Figure 1; references 36: 8 Russian, 28 Western.  
[557-12131]

UDC 616.936-022.375(477.75)

#### IMPORTED MALARIA IN CRIMEA

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 83 (manuscript received 23 Nov 83) pp 21-22

BORISOVA, M. A., KOSIK, O. G., SIROTYUK, N. P. and ZHULAYEVA, T. Ye., Chair of Infectious Diseases, Crimean Medical Institute; Parasitological Laboratory, Crimean Oblast Sanepid Station, Simferopol'

[Abstract] Increasing visits to the Crimea by tourists and students from places where malaria is endemic have resulted in growing frequency of imported malaria cases. From 1957 to 1981 54 carriers and 193 victims of the disease were recorded, of whom 23 percent were Soviet citizens returning from regions where malaria is common. Of all cases, 75 percent were registered during the most active period of the third quarter of the year, and 61 percent in July and August. Most commonly, the parasite was *P. falciparum* (79.3 percent), followed by *P. vivax* (11.6 percent). Various diagnoses, such as flu, adenoviral infections and other ailments, were commonly made instead of malaria. Only blood tests revealed the actual ailment. The need for early diagnosis, quarantine and treatment is stressed. References 3: 2 Russian, 1 Western.  
[557-12131]

## STUDY OF FOCI OF ZOONOSE CUTANEOUS LEISHMANIASIS IN SECTIONS OF PROSPECTIVE KARAKUM CANAL ROUTE

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 83 pp 51-55

PONIROVSKIY, Ye. N., MEL'KUMYANTS, A. N., KUZNETSOVA, N. A. and LUKMANOVA, N. E., Ashkhabad Scientific Research Institute of Epidemiology and Hygiene imeni S. M. Dursunova

[Abstract] Considerable importance is attributed to predicting possible epidemics of zoonose cutaneous leishmaniasis (ZCL) along the Karakum canal route. The present article reports on observations along the clay and sand desert interface of the central Karakum region of the Kizilarvat rayon of the Turkmen SSR. The study included 1,561 human subjects, 268 rodent carriers and 1,914 mosquitoes transmitters of the disease. Only the large gerbil among rodents studied was found to carry the disease. Five species of mosquitoes were found to be transmitters: *Ph. paptasi*, *Ph. andrejevi*, *Ph. caucasicus*, *S. arpaklensis* and *S. clydei*. The added soil moisture resulting from irrigation will probably increase the population of mosquitoes, the intensity of pathogen circulation and the risk of human infection with zoonose cutaneous leishmaniasis. References 8 (Russian). [557-12131]

## RESULTS OF FIVE YEARS OF COOPERATION OF SOVIET SCIENTIFIC INSTITUTIONS WITH SPECIAL PROGRAM OF SCIENTIFIC INVESTIGATIONS AND TRAINING OF SPECIALISTS IN TROPICAL DISEASES, GOALS OF ALL-UNION TROPICAL DISEASE COORDINATION CENTER

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 83 (manuscript received 28 Sep 82) pp 72-74

NIKOLAYEVSKIY, G. P., SOPRUNOV, F. F. and VOYSKUNSKAYA, N. I., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] This is a summary of Soviet contributions to collaboration in combating parasitic diseases through prophylaxis and treatment. Eighty-one member-countries of WHO participated. The program expended \$64.1 million (\$189.8 thousand by the USSR) on 1,268 scientific studies during the 5-year period reviewed. Topics included malaria, leishmaniasis, leprosy, onchocerciasis and other related diseases. Cytological and genetic research has been supplemented by practical study of chemical and mechanical means of mosquito control and eradication, as well as the organization of public health and epidemiological services. Soviet research organizations involved in the project are cited. References 9: 7 Russian, 2 Western. [557-12131]



ECOLOGICALLY SAFE METHODS FOR MALARIA VECTOR CONTROL

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 82 (manuscript received 8 Jul 81) pp 39-42

KHROMOV, A. S. and IZOTOV, A. I., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] A review is provided of ecologically safe methods for the control of the anopheline carrier of malaria, particularly with the emergence of drug resistant forms of plasmodia. This problem is particularly acute in the developing countries where changing agricultural practices involve extensive drainage and irrigation systems that themselves alter the ecologic balance and, while destroying some anopheline breeding grounds, create others. Ecologically acceptable measures include the introduction of fish that feed on anopheline larvae (provided that they do not alter the existing piscine balance), microbiological agents that serve as pathogens for insects and/or their toxins, genetic manipulation of the insects by the introduction of mutants incapable of reproduction but active in mating, etc. The USSR has been particularly active in the use of biological control methods for malaria, and has shared its experience with the developing countries via such programs as UNEP. References 20: 16 Russian, 4 Western. [560-12172]

CHARACTERIZATION OF CENTRAL ASIAN DESERT PLAGUE FOCI IN TERMS OF HYDROTHERMAL COEFFICIENT

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 82 (manuscript received 23 Feb 81) pp 46-50

SERZHANOV, O. S., AUBAKIROV, S. A., FOMUSHKIN, V. M., AGEYEV, V. S. and TURKPENBAYEV, N. Zh., Central Asian Scientific Research Anti-Plague Institute, Alma-Ata; Main Administration for Contagious Infections, USSR Ministry of Health, Moscow

[Abstract] The hydrothermal coefficient of Selyaninov ( $HC = (\text{total precipitation} \times 10) / (\text{total temperature-active})$ ) determined for the 1951-1980 period was used as a basis for characterization of the various Central Asian desert areas in relation to population density of the flea *Xenopsylla* and epizootic plague outbreaks. The results of such analyses showed a high degree of correlation between the hydrothermal conditions and plague, and resulted in the identification of three areas where outbreaks of plague could be predicted on the basis of the flea population. The areas fall into groups in which optimum hydrothermal conditions for the flea prevail in 88-100 percent

of the case, years, 57-76 percent of the case-years and 39 percent of the case years. As a result, in the first group the epizootic process is continuous, in the second group it occurs at 2-4 year intervals and in the third group at 8-12 year intervals. These regions are indicated in cartographic form. Figures 3; references 11 (Russian).  
[560-12172]

UDC 579.834.114:579.253].083.12

#### ATTEMPT AT SPECIATION OF TICK-BORNE RELAPSING FEVER AGENT

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 82 (manuscript received 1 Mar 82) pp 74-79

KRYUCHECHNIKOV, V. N., KORENBERG, E. I. and SHCHERBAKOV, S. V., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Sciences, Moscow

[Abstract] It is commonly assumed that speciation and strain identification of borreliae is difficult because of similarities in morphology, difficulties of cultivation and marked antigenic variation in the course of an illness. In the present study (on materials from the Tazik SSR), comparative studies were conducted on the strain of borrelia isolated from a patient and strains isolated from tick vectors collected at the time of infection from the same cave. Employing guinea pigs as the host for clinical and microscopic studies, the studies demonstrated that different strains of borrelia responsible for tick-borne relapsing fever can be differentiated in terms of their tendency for bacteremia, their pyrogenicity, virulence and specificity of post-infection immunity. The differences are particularly evident in studies involving active cross-immunization. Other bacteriologic and diagnostic criteria cannot by themselves serve to differentiate the various strains, but complement the above criteria. Such criteria were employed to demonstrate the identity of a borrelia strain responsible for a human case of tick-borne relapsing fever with the agents isolated from soft ticks present in the case where the infection took place. References 14: 8 Russian, 6 Western.

[560-12172]

INTERNATIONAL SCIENTIFIC PROJECT FOR ECOLOGICALLY SAFE CONTROL OF MALARIA  
AND ITS VECTORS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4,  
Jul-Aug 82 pp 86-87

KHROMOV, A. S., SOPRUNOVA, N. Ya. and IZOTOV, A. I., Institute of Medical  
Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry  
of Health, Moscow

[Abstract] The 2nd International USSR/UNEP Course on Ecologically Safe  
Control of Malaria and its Vectors was held from August 19 to September 30,  
1981. The participants included 12 specialists from 9 African countries  
(Gambia, Ghana, Mauritius, Mali, Nigeria, Sudan, Sierra Leone, Tanzania,  
Tunisia), 7 from Asia (Laos, Pakistan, Syria, Sri Lanka, People's Democratic  
Republic of Yemen), and 4 scientists from Latin America (Mexico, Peru,  
Jamaica). The lectures were delivered by leading Soviet specialists in  
this area, laboratory studies were conducted at the Institute of Medical  
Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy in Moscow,  
and field work was done in Krasnodar Kray, Georgia and Azerbaijan. The  
foreign participants also had the opportunity to report on the malaria  
situation in their countries, and all were highly impressed with the quality  
of the training and research efforts in the USSR. It is anticipated that  
the next course will be held in 1982.

[560-12172]

CURRENT STATUS OF DRUG RESISTANCE IN TROPICAL (P. FALCIPARUM) MALARIA

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 6,  
Nov-Dec 83 (manuscript received 25 Jul 83) pp 6-15

OZERETSKOVSKAYA, N. N., Institute of Medical Parasitology and Tropical  
Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] A review is provided of the current state of knowledge of the  
drug resistance of *Plasmodium falciparum* and the implications of this state  
for human welfare. Initial success in the treatment of clinical cases of  
malaria with some antimalarials has been counteracted by the appearance of  
resistant strains and, in some situations, by neglect of mosquito control  
measures because of the success of initial chemotherapeutic experience.  
Current studies involve determination of the genetic basis underlying  
resistance to chloroquin quinoline agents, and are complemented by coordina-  
tion of global efforts at the eradication of malaria. The latter efforts  
involve public health measures and medical research on the immune factors  
that modify the course of malaria, and the realization that mass

chemotherapeutic prophylaxis may actually contribute to the selection of resistant plasmodial strains. References 80: 23 Russian, 57 Western.  
[561-12172]

UDC 616.99-084.4:008

#### CURRENT BIOLOGICAL CONTROL OF HUMAN PARASITIC DISEASE VECTORS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 6, Nov-Dec 83 (manuscript received 26 Jul 83) pp 15-21

ALEKSEYEV, A. N., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] A review is provided of the current biological control methods employed for the control of human parasitic diseases, with the note that such programs commenced in the USSR in the '20's when predatory fish (*Gambusia affinis*) were imported from Italy for the control of *Anopheles* mosquitoes in Transcaucasia. Considerable attention is devoted to the latest findings on the use of *Bacillus thuringiensis* as an entomopathogenic agent, as well as the delta toxin derived from this bacterium. Coverage is also given to the more recent, promising results obtained with *B. sphaericus* in the control of the mosquitoes *Aedes aegypti* and *Anopheles psorophora*, and with the much more susceptible *Culex* sp. More recent developments deal with some effective fungal preparations, particularly *Culicinomyces clavosporus* and *Lagenidium giganteum*, and mention some of the less effective but still interesting fungi. The review concludes with the use of various parasites for the destruction of the tsetse fly. A singular advantage of the biological control measures is that they are generally innocuous with respect to humans and other mammals, and do not present a pollution problem.

References 7: 2 Russian, 5 Western.

[561-12172]

UDC 576.895.771.095.1(476)

#### CURRENT POPULATION DENSITY OF ANOPHELINE MOSQUITOES IN BELORUSSIA

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 6, Nov-Dec 83 (manuscript received 12 May 82) pp 63-67

TRUKHAN, N. M. and BARKOVICH, E. N., Institute of Zoology, Belorussian SSR Academy of Sciences; Republic Sanitary and Epidemiologic Station, Belorussian SSR Ministry of Health, Minsk

[Abstract] A survey conducted on the current population status of anopheline mosquitoes on the territory of the Belorussian SSR has shown that the population density has decreased two- to three-fold during the past decade. This

has been due both to effective control measures and agricultural expansion which resulted in the drainage of large areas. In connection with the latter factor, however, it should be noted that the construction of extensive canals and other waterworks for both drainage and irrigation purposes has created new breeding grounds for the anopheline mosquitoes. On an overall basis, highest anopheline population densities are encountered in the western regions of the republic, with counts ranging up to 20-25 specimens/m<sup>2</sup>, while the lowest counts prevail in the eastern regions with mean counts of at least half that figure. References 15 (Russian). [561-12172]

UDC 616.61-002.151-02:578.833.29]-078.73

# SEROLOGICAL STUDY OF VICTIMS OF HEMORRHAGIC FEVER WITH RENAL SYNDROME IN EUROPEAN USSR

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 83 (manuscript)  
pp 676-680

DZAGUROVA, T. K., LESHCHINSKAYA, Ye. V., TKACHENKO, Ye. A., MYASNIKOV, Yu. A., ZAGIDULLIN, I. M., GASANOVA, T. A., USTYUGOVA, G. M., REZAPKIN, G. V., STEPANENKO, A. G and IVNAOVA, A. A., Institute of Poliomyelitis and Viral Encephalitites, USSR Academy of Medical Sciences, Moscow

[Abstract] Clinical diagnosis of hemorrhagic fever with renal syndrome (HFRS) has been hampered in the Soviet Union and elsewhere by shortcomings in laboratory methodology, but in recent years Korean scientists have used a fluorescent antibody method (FAM) to identify the Korean variant of HFRS in lung tissue of rodents. The present study combines that approach with radioimmunological analysis (RIA) and compares these results to clinical diagnoses. An experimental section summarizes antibody, serological and analytical methods. The FAM was successful in discovering antibodies in 79 percent of cases in the first week, and 64 percent of those in the first 3 days of infection. Direct RIA identified 27 percent of cases in the first week and 65 percent in the second week. Since few of the victims showed clinical symptoms, the authors conclude that they had subclinical and atypical forms of HFRS. Results indicated that in the European USSR there is a tendency for antibody titers of HFRS to continue to increase for as much as 6 months after a patient has clinically recovered from the disease, apparently because the antigen-antibody complex decomposes freeing antigens to further stimulate immunocompetent systems. The wide variations in clinical symptoms hampered the study significantly. References 5 (Western). [582-12131]

CLINICAL-EPIDEMIOLOGIC OBSERVATIONS IN NATURAL TICK-BORNE ENCEPHALITIS FOCI  
IN KIRGHIZIA

Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 1, Jan-Feb 84 pp 14-17

SURANCHIYEVA, R. K. and VARGINA, S. G., Kirghiz State Medical Institute;  
Kirghiz Scientific Research Institute of Epidemiology, Microbiology and  
Hygiene

[Abstract] Twelve cases of tick-borne encephalitis were reported in Kirghizia in 1976-1981. The authors undertook a clinical and epidemiological analysis of these 12 cases. The patients, receiving treatment in a city clinical hospital, were from Frunze and the surrounding area. A variety of clinical manifestations was observed. Mild forms manifested general infectious symptoms including fever, headache, general weakness, nausea. The meningeal form was the most frequent form of infection. Three patients experienced two waves of infection. The severity of the disease varies from location to location. Mild forms predominate, focal infections are rare and none of the cases studied was fatal. Thus, apparently, low virulence forms are circulating in the area.  
[563-6508]

UDC: 618.98:579.842.14].036.2-078:[579.842.14:579.252.55:615.33

SIGNIFICANCE OF ANTIBIOTIC RESISTANCE OF SALMONELLOSIS PATHOGEN IN EPIDEMIOLOGY AND DISEASE CONTROL TACTICS

Moscow ANTIBIOTIKI in Russian No 2, Feb 84 pp 112-116

BLOKHINA, I. N., KHAKHAREVA, T. P., BELOVA, T. N., BRUSNIGINA, N. F., and YAKOVLEV, A. V., Scientific Research Institute of Epidemiology and Microbiology, Gorkiy

[Abstract] The purpose of this work was to study the antibiotic resistance of salmonella, establish its nature and analyze the possibility of using virulent bacteriophages constructed considering the biological specifics of circulating strains to control antibiotic-resistant microorganisms. Some 1,501 strains of salmonella of 69 serovars in groups B, C, D and E including 659 salmonella typhimurium cultures were studied. Conjugation crossing of 217 strains of salmonella was performed by the method of Miller using as the recipients E. coli K12 C600 5K rif-thr-leu-lac- and E. coli J62 nal<sup>r</sup> rif<sup>r</sup> str<sup>r</sup>. Mitomycin C and proflavin were used to eliminate plasmids. Effective bacteriophages were prepared by extracting active phage races from sewage by inoculating selected cultures of S. typhimurium. It was found that strains having resistance to antibacterial preparations were most characteristic for S. typhimurium. In Gorkiy and the surrounding region, strains containing conjugative R plasmids determining resistance to tetracyclin and chloramphenicol with a molecular mass of 58-64 Md are primarily in circulation. Antibiotic-resistant strains are epidemiologically most dangerous.

The use of specific polyvalent bacteriophages is suggested for treatment of patients and carriers as well as for prophylactic treatment as indicated epidemiologically to prevent group disease when a source is found. References 15: 10 Russian, 5 Western.  
[575-6508]

## FOOD TECHNOLOGY

### PATENT AND INFORMATION SUPPORT OF RESEARCH AND DEVELOPMENT IN SECTOR OF MACHINE-BUILDING FOR LIVESTOCK AND FEED INDUSTRY

Moscow VOPROSY IZOBRETATEL'STVA in Russian No 4, Apr 84 pp 16-17

[Article by A. G. Kuzankov and S. N. Nefedov (Moscow)]

[Text] In the decisions of the May (1982) Plenum of the CPSU Central Committee, a significant role is assigned to the USSR Ministry of Machine Building for Livestock and Feed Industries in development of the nation's agroindustrial complex and implementation of the Food Program. Under the 11th Five-Year Plan, this ministry has been given the task, in the light of these decisions, to accelerate scientific and technological progress, upgrade technical sophistication of machinery and equipment for integrated mechanization of production processes in the livestock and feed industries, primarily on the basis of development and introduction of new and highly effective inventions.

A good quality of ongoing patent and information support of scientific research, design and technological planning work is very important to expedite this work. Investigation and analysis of patent materials make it possible to define the current scientific and technological level and trends of development of machinery for livestock raising and feed production, the desirability of R&D [research and development--"scientific research and experimental design work"], of pursuing studies in a given direction of engineering and economic aspects of foreign patenting and sale of licenses. This work can be done well only if there is correct organization of work for acquisition of patent fund, ongoing and purposeful supply of patent information when developing new equipment.

Since 1976, the patent services of organizations in this sector have been working in accordance with a single coordinating research plan, in which one of the topics is "Investigation, scientific analysis of domestic and foreign patent materials in the area of building machinery for the livestock and feed industries." The basic directions in this field are analytical and statistical processing of patent information, preparation of informative abstracts pertaining to foreign and domestic inventions, and complete supply of relevant information for R&D on the basis of the sectorial patent fund acquired by organizations.

The organizational structure of sectorial patent information includes the following patent services: chief organization--VNIKOMZh [expansion unknown], base organizations--VNIIZhivmash [All-Union Scientific Research Institute of



Machinery for Livestock Industry?]) and RostNIITM [Rostov Scientific Research Institute of Machine-Building Technology], and nine other organizations responsible for acquiring the patent fund pertaining to scientific problems assigned to them.

Acquisition of the sectorial patent fund is done by organizations of the sector in accordance with the approved Instructions of the State Committee for Inventions, pertaining to acquisition and organization of sectorial patent funds as part of the reference and information funds of scientific and technical information agencies of enterprises and organizations of ministries and agencies. The patent funds of organizations contain descriptions of inventions pertaining to directions of work assigned to them, as well as the necessary set of standards-related, methodological and instruction materials. The reference retrieval system (SPA) includes a sectorial subject index of categories, which was developed by VNIKOMZh in accordance with the third edition of MKI [expansion unknown], a systematized card file on the topics of the organization, cardfiles listing numbers, firms, author certificates issued to organization, patent data, etc.

The volume of the patent fund of sector organizations is determined by the structure and orientation of their work. The fund is updated for both the different categories of MKI, and selectively, with sampling of patents and author certifications represented by xerox copies and microfilm of invention descriptions.

The overall volume of the sectorial patent fund as of 1 January 1983 consisted of 1,454,000 descriptions of inventions given author certificates and patents. The information retrieval system consists of 959,800 index cards.

Patent-information support of R&D is provided in accordance with GOST 15.011-82, "Procedure for Patent Investigations." Patent investigations are conducted by specialized departments under the methodological supervision and with the participation of patent services, in accordance with the plan for patent investigations, which is approved by the organization's management. The report that is prepared in the course of R&D about patent investigations contains data about depth of the search, breadth of coverage of different countries, studied sources of scientific-technical and patent information, comprehensive analysis of existing level of technology in the sector of machine building for the livestock and feed industries, evaluation of planned and achieved technical and economic indicators, as compared to best existing models of equipment.

It must be stated that in several organizations in this sector the report about patent investigations is the basis for determining the technicoeconomical indicators of results of work on a given topic. These indicators are determined in accordance with the standard for the sector, "Evaluation of scientific and technical quality of developments," which sets the same rules and procedure for assessing the scientific-technical level of quality of R&D in the sector.

Such an evaluation is made in a differentiated way according to indicators of purpose, reliability and durability, technological feasibility, standardization and unification, as well as patent-legal and economic indicators.

The standard establishes three ratings for technical level of quality (for both individual types of indicators and object of development as a whole): "Above [already] achieved level," "On achieved level" and "Below achieved level."

Purposeful investigation and use of patent information made it possible to improve significantly the effectiveness of patent and license work of sectorial organizations. For example, the planetary-rotor hydraulic motor developed by KTISM [expansion unknown] (Zaporozhye Oblast), contains 18 inventions patented abroad. The development of VNIKOMZH, "Method of utilizing animal waste and unit for this purpose," makes it possible to recover inexpensive gas fuel through the process of anaerobic treatment of manure, as well as high-grade organic fertilizers and protein for feed. This development consists of six inventions, patents have been received in France and GDR. A total of 10 licenses have been sold for technology of agricultural machine building, the countries including Japan and FRG.

In 1982, the economic effect of using inventions constituted 17.8 million rubles; 353 author certificates were issued (versus 331 in 1981).

At the present stage of development of scientific and technological progress, improvement of patent and information support of R&D would be impossible without development and use of automated systems for processing patent information distributed in a centralized manner on computer-read tape recorders. Participating in implementation of the Program for Development of GSPI [State All-Union Planning Institute] for 1981-1985, the VNIKOMZH continues to work on development and introduction of an automated system for processing patent information in the sector, entitled ASNTIzhivmash [automated system of scientific and technical information on livestock industry machinery?], in order to provide for centralized acquisition of bibliographic information for the patent fund pertaining to patents and microcopies of descriptions of inventions. In addition, forms of presentation of data concerning subscriber use of patent information on computer-read carriers, forms for furnishing bibliographic information (numbered, subject index and firm name cards) to subscribers, quarterly and annual indexes have been developed.

Considering the labor expended to retrieve and process both patent and scientific-technological and commercial information, work has begun on the joint study of conditions of foreign markets within the limits of YESNTImash [unified system of scientific and technical information on machine-building] in order to increase the efficiency of work on foreign patenting of inventions, sale of licenses and expanding the list of products exported by the sector.

However, it should be noted that the effectiveness of furnishing patent information for R&D in the sector is still not high enough. According to the evaluation of the temporary scientific and technological commission of GKNT [State Committee for Science and Technology], there has been insignificant increase in share of products of the sector on a par with the best domestic and foreign scientific and technological achievements (69.3% in 1983, versus 63% in 1980).

For this reason, at the present time attention is focused mainly on this direction. The sector's organizations are conducting joint work on the topic of "Analysis of technological sophistication and directions of development of machine building for the livestock and feed industries, on the basis of integrated studies of patents." The measures elaborated by the ministry include examination by scientific and technical councils of the results of patent investigations conducted by organizations at the R&D planning stage and

validity of conclusions (made on the basis of comparing planned technical-economic indicators for a development in question to the best existing version of a given form of equipment) as to the desirability of including items in the plan. These measures served as a real basis for excluding small, insignificant projects that do not help develop scientific and technological progress in the sector.

In addition, there are plans to establish a sectorial coordination council for evaluation of the technical sophistication and competitiveness of machinery and equipment referable to the sector, on the basis of patent-information models of sets of machinery for performance of the basic technological processes in an agroindustrial complex, with development of appropriate methods in 1984. Implementation of the planned measures will help the sector to find better solutions to the problems set forth in the Food Program.

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CSO: 1840/1029

## PATENT AND INFORMATION SUPPORT OF ENTERPRISES AND ORGANIZATIONS OF MOLDAVIAN AGROINDUSTRIAL COMPLEX

Moscow VOPROSY IZOBRETATEL'STVA in Russian No 4, Apr 84 pp 18-19

[Article by P. T. Raku (Kishinev)]

[Text] In Moldavia, which is a region of large-scale commercial viticulture and horticulture, vegetable and industrial crop growing, with development of grain growing and livestock products, a modern republic-level agroindustrial complex (AIC) has presently been formed, which constitutes the core of this republic's economy.

The Moldavian agroindustrial complex consists of about 900 enterprises and organizations referable to sectors of the national economy such as tractor and farm machine building, machine building for the livestock and feed industries, food and meat-dairy industry, procurement, storage and processing of agricultural raw materials, industrial engineering maintenance and repair services for agriculture, etc.

AIC production constitutes 60% of the aggregate national product of this republic and over 54% of the national income. About 50% of all workers are engaged in this area of production. Hence the major and difficult problems put to information agencies, including the patent information services that furnish information to enterprises and organizations, as well as specialists concerned with implementation of one of the most important political and economic programs of our country, the Food Program.

Patent-information services to enterprises and organizations of Moldavia are provided by the base territorial patent fund (BTPF), the RNTB [republic scientific and technical library] of the Moldavian Scientific Research Institute of Scientific and Technical Information of the Moldavian Gosplan and 57 patent services of enterprises and organizations, the fund [stock] of which constitutes over 8.5 million patent documents.

The BTPF is acquired according to the universal topics with original descriptions of inventions of the USSR and 16 foreign countries, patent bulletins, bibliographic and methodological publications. A centralized information retrieval system was established for better use of BTPF, which reflects all of the documents in the fund. Each year, the BTPF services 2100 subscribers (including

1200 collective ones) and furnishes them with about 1.5 million copies of documents in different modes of information servicing.

In 1983, the department of patent documentation of RNTB analyzed use of patent documentation fund by enterprises and organizations of the AIC in 1982 in order to assess the quality of service.

The results of analysis revealed that patent-information servicing by the BTPF covers 618 enterprises and organizations of AIC (which constitutes 70% of their total number), representing 29 ministries and agencies of this republic (yet only 35 of the 877 enterprises and organizations of the AIC have patent services); 259 enterprises do not use patent records.

The data obtained on issuance of patent documentation were analyzed together with the information obtained by the Central Statistical Administration of Moldavian SSR concerning projects worked on by enterprises and organizations of the AIC. Information about the number of submitted applications for inventions, number of positive answers received, introduced inventions and economic effect was also used. Thus, in 1982, AIC enterprises and organizations were issued 310,000 patent documents; in the same period, they submitted 284 applications, 160 of which were approved, and 179 inventions were introduced with an economic effect of 22 million rubles.

Analysis of these data revealed that, the more intensively enterprises made use of the fund, the larger the number of approvals they received and the more inventions were introduced. For example, enterprises under the Moldavian Ministry of Agriculture were furnished with 47,000 patent documents in 1 year; they submitted 45 applications for inventions and received 24 approvals. Enterprises and organizations under the Moldavian Goskomsel'khoshtekhnika [State Committee for Supply of Production Equipment for Agriculture] was furnished with 46,000 patent documents; they submitted 20 applications and received 12 approvals. Enterprises and organizations under the Ministry of Tractor and Agricultural Machine Building received 64,000 documents; they submitted 68 applications and received 38 approvals.

It should be noted that some difficulties were also encountered in the work of organizing patent information services. We found, for example, that some enterprises and organizations situated in rural areas, which are the main executors of the Food Program, do not use the services of the BTPF. For example, more than 70% of the 259 enterprises and organizations of the AIC that do not make use of patent information are situated in rural areas.

For this reason, attention was focused chiefly on sovkhoz-plants, sovkhoztekhnikums, large farms and industrial enterprises where patent information could be used to solve production problems.

It was decided to make use of the libraries at scientific and technological progress centers, which have been organized in rayon centers, to render services pertaining to delivery of patent information to these enterprises. For this purpose, Patent Information Days are scheduled together with the libraries, copies of documents are made at the request of DNTP [houses of scientific and technical propaganda], joint seminars and consultations are organized for local specialists.

The form of issuing information documents through interlibrary loans and in the mode of "request-answer" is instrumental in more active servicing of enterprises and organizations in rural areas. Information letters are sent to these enterprises concerning services provided by the BTPF, several zonal seminars and conferences have been held dealing with problems of using patent documentation.

At the present time, we can already state that some positive results have been achieved in the work to organize patent information services for the AIC. While 2364 documents were issued through interlibrary loans from the fund and 64 subscribers were serviced in 1980, in only 10 months of 1983 24,000 documents were furnished through interlibrary loans and 460 subscribers were serviced.

In the same period, the BTPF answered 24,000 inquiries and made copies of 106,000 pages of patent documents.

In order to systematize measures to spread information about the services of BTPF, letters were mailed out to enterprises and organizations of the AIC with suggestions to send to the RNTB requests for such measures in the current year. A summary plan of mass scale RNTB measures was prepared on the basis of requests received from enterprises, which included setting days and weeks of patent information, days of patent specialists, special-subject exhibits with determination of the dates and places for them.

The 1984 plan includes more than 100 measures pertaining to patent information provisions in special-purpose integrated programs, which made it possible to take into consideration the wishes of subscribers about organizing measures to propagandize information about BTPF, as well as to bring their subject matter closer to the problems that are being solved by AIC enterprises and organizations.

Patent information services for the AIC in the republic continue to improve by means of deeper investigation of the information requirements, expansion of forms and methods of operation, improvement of quality of instituted measures.

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DETERMINATION OF MAXIMUM POSSIBLE AMOUNT OF MEAT SUBSTITUTES USING PROTEIN ISOLATES IN MIXED MEAT PRODUCTS

Moscow VOPROSY PITANIYA in Russian No 6, Nov-Dec 83 (manuscript received 1 Feb 83) pp 33-37

SAFRONOVA, A. M., Institute of Nutrition, USSR Academy of Medical Sciences, Moscow

[Abstract] The question of adequate provision of essential amino acids in the human diet by means of protein meat substitutes is considered. Experiments are described in which combined meat and protein substitute products (20 combinations) were tested in laboratory animals to determine the biological values of the substitutes when added in varying amounts to the meat. Amino acid values used in the experiments were based on FAO/WHO standards. The experimental findings showed a definite correlation between the biological value of total protein in the diet as a function of substitution by the protein substitutes by altering the relationships between the different amino acids present. Details of these changes are described for soybean protein, sodium caseinate and blood plasma proteins. Calculated values and experimental findings confirm that protein substitution of meat products does not reduce the food value of mixed products if the soybean protein substitution is 25% or less, the sodium caseinate 50 percent or less, and the blood plasma proteins 25 percent or less, or in combinations of these three protein categories. References 9: 4 Russian, 5 Western.  
[572-9642]

## GENETICS

UDC 51-76:576.356.2

### SIMULATION OF INFLUENCE OF CELL PROLIFERATION DELAY ON FREQUENCY OF CHROMOSOME ABERRATIONS AND THEIR DISTRIBUTION IN CELLS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 2, Jan 84 (manuscript received 17 Jun 83) pp 419-422

VIKTOROV, V. V., Institute of Medical Genetics, USSR Academy of Medical Sciences, Moscow (presented by Academician A. A. Bayev 8 Jun 83)

[Abstract] Influence of a change of cell cycle duration on the mean number of cell chromosome aberrations and the type of chromosome aberration distribution throughout the cell was studied by simulation. A modelling experiment in which the rate of cell fission did not depend upon the number of chromosome aberrations found in them showed that asynchronization does not affect chromosomal aberration frequency nor the form of aberration distribution in the cells. Mean frequency of chromosome aberrations decreased with introduction of delay but gradually increased with removal of immobilization points from the moment of effect by the mutagen. In order to make an integral assessment of injury of the cell population, this effect must be averaged for the largest possible interval of immobilization points. This value increases with increase of delay time and the form of distribution from a Poisson to a binomial form. Figures 2; references 9: 4 Russian, 5 Western [544-2791]

UDC 575.1

## HUMAN GENES AND BRAIN

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 2, Jan 84 (manuscript received 18 Jul 83) pp 427-431

DUBININ, N. P., academician, ATA-MURADOVA, F. A., VITVITSKIY, V. N. and VITVITSKIY, L. V., Institute of General Genetics, USSR Academy of Sciences, Moscow

[Abstract] Level of functional activity of the genome of various sections of the brain in the human adult, in the initial period of differentiation



(22 week-old embryo) and at the moment of most intense maturation (first post-partum day) was studied to ascertain the functional activity level of the genome of various sections of the brain. It was found that the genetic apparatus activity of each of the brain structures studied has distinctive features distinguishing it from such in cells of other structures and organs. These features can be found by the methods used in this experiment only at different stages of development of the body, differing for different brain structures. Highest levels of transcription, and the high level of enzymic modification of the genome correlated with it, are seen for cells of reasoning zones of the cortex. The fact that these phylogenetically newest regions of the brain evolving in association with the use of speech and thought are characterized--in addition to cytoarchitectonic and physiological peculiarities--by uniquely high functional activity of the genome, provides new means of studying distinguishing features of the human brain and principles of its evolution. Figures 3; references 15: 7 Russian, 8 Western.  
[544-2791]

UDC 579.852.11:579.254.2].04:579.861.2

TRANSFORMATION OF BACILLUS SUBTILIS BY CRUDE STAPHYLOCOCCAL LYSATES CONTAINING PLASMIC DNA

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 8, Aug 83 (manuscript received 1 Oct 82) pp 78-80

IVANOV, N. A., DANILOVA, Ye. G., MEDVEDKOVA, N. A. and PEKHOV, A. P., Chair of Microbiology, Khabarovsk Medical Institute; Chair of Biology and General Genetics, Peoples' Friendship University imeni P. Lumumba, Moscow

[Abstract] Crude lysates of *Staphylococcus aureus* and *S. epidermidis*, containing various plasmids, were employed for the transformation of *Bacillus subtilis*, evaluation of the transformation frequency in comparison with staphylococcal transformation, and assessment of plasmid DNA expression in *B. subtilis*. Depending on the marker under study (penicillinase production, cadmium resistance, levomycetin resistance), *B. subtilis* was transformed with a frequency of  $(1.68-20.6) \times 10^{-10}$ . The plasmid genes were expressed in the *B. subtilis* cells, but the loss of plasmids from the bacilli was significantly higher ( $P < 0.001$ ) for most markers than in staphylococci. Figures 2; references 9: 4 Russian, 5 Western.  
[568-12172]

VITAMIN PARA-AMINOBENZOIC ACID PREVENTS DEVELOPMENT OF 'SOS'-FUNCTIONS IN  
ESCHERICHIA COLI *tif-1*-MUTANTS AT NONPERMISSIVE TEMPERATURE

Moscow GENETIKA in Russian Vol 19, No 12, Dec 83 (manuscript received  
7 Feb 83) pp 1952-1957

VASIL'YEVA S. V., GORB, T. Ye. and RAPOPORT, I. A., Institute of Chemical  
Physics, USSR Academy of Sciences, Moscow

[Abstract] Para-aminobenzoic acid (PABA) inhibited some functions of the  
"SOS-reparation system during its induction at nonpermissive temperature  
(42°C) in experiments on *E. coli* *tif-1 sfi A* and *E. coli* *tif-1 sfiA* ( $\lambda$ ).  
PABA reduced the frequency of prophage  $\lambda$  induction 400-fold in comparison  
with the control; effectiveness of W-reactivation of ultra-violet irradi-  
ated phage  $\lambda$  decreased more than 2-fold (from 37.5 percent to 16 percent).  
PABA also reduced the yield of uv-induced recombinants on the RecF-pathway  
of recombination 1.5-fold. PABA did not reduce the yield of spontaneous  
recombinants on RecBC- nor on RecF pathways in various genetic crossings; it  
did not affect spontaneous mutagenesis processes, prophage  $\lambda$  induction or  
W-reactivation. Data from this study and from previous studies indicate  
that vitamin PABA is one of the factors of genetic stability of *E. coli*.  
References 13: 4 Russian; 9 Western  
[535-2791]

UDC 577.2:576.851.5:576.316:576.342

TRANSFORMATION OF COMPETENT CELLS OF BACILLUS SUBTILIS WITH CHROMOSOMAL AND  
PLASMID DNA'S INCORPORATED IN LIPOSOMES

Moscow GENETIKA in Russian Vol 19, No 12, Dec 83 (manuscript received  
23 Feb 83; final draft received 14 Apr 83) pp 1958-1964

GLUMOVA, Ye. F. and PROZOROV, A. A., Institute of General Genetics, USSR  
Academy of Sciences, Moscow

[Abstract] Transformation of chromosomal and plasmid DNA, contained in  
liposomes of various composition, was studied on competent cells of *Bacillus*  
*subtilis*. It was found that transformation of chromosomal DNA in the  
liposomes constitutes 1.1-1.5 percent of the control transformation while  
transformation of plasmid DNA in the liposomes constitutes 8-11 percent of  
the control plasmid transformation. It was found that absorption by com-  
petent cells, enclosed in liposomes of chromosomal or plasmid DNA, is  
higher by 1-2 orders of magnitude than absorption of chromosomal or plasmid  
DNA not contained in the liposomes. It was found that chromosomal DNA in  
liposomes enters competent cells in double-strand form while it enters the  
cell in single-strand form during ordinary transformation without use of  
liposomes. Figures 1; references 14: 3 Russian, 11 Western  
[535-3791]

REGULATION OF  $\phi$ 81 INT GENE EXPRESSION

Moscow GENETIKA in Russian Vol 19, No 12, Dec 83 (manuscript received 11 Feb 83, final draft received 5 May 83) pp 1965-1970

SINEOKIY, S. P., BALANDINA, L. A., ZINOV'YEVA, V. A. and KRYLOV, V. N.,  
All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow

[Abstract] Dependence of  $\phi$ 81 int gene expression on products of genes cII and cIII and complementation of functions of products of genes cII and cIII of phage  $\lambda$  phage and  $\phi$ 81 phage were studied. It was found that there are genes cII and cIII, responsible for producing immunity, present in  $\phi$ 81 phage just as in  $\lambda$  phage together with cI gene.  $\phi$ 81 int gene expression is controlled positively by products of genes cII and cIII of  $\phi$ 81 phage. Gene cII and gene cIII of phage  $\phi$ 81 do not complement functions of products of analogous genes of  $\lambda$  phage. Figures 2; references 16: 2 Russian, 14 Western [535-2791]

UDC 577.21

## CUTTING INSERTIONS FROM DNA MOLECULES DURING FORMATION OF HETERODUPLEXES AS POSSIBLE MECHANISM OF MAINTAINING GENOME STABILITY

Moscow GENETIKA in Russian Vol 19, No 11, Nov 83 (manuscript received 29 Dec 82) pp 1749-1752

ZAKHAROV, I. A., Leningrad Institute of Nuclear Physics imeni B. P. Konstantinov, USSR Academy of Sciences

[Abstract] A discussion is presented of an attempt to show that gene conversion may serve as a mechanism liberating chromosomes from fragments of various kinds of additional DNA, including parasitic DNA, incorporated in them. It is assumed that, if there is an additional nucleotide sequence within the limits of the heteroduplex section in one of the chains, the forming one strand loop can be attacked by nucleases specific for one strand DNA. In this case, conversion acquires a directional nature and its insertions in the DNA are cut. It is assumed that the high activity of such nucleases correlates with the low DNA level in the genome and impedes progressive evolution of the taxon. Figure 1; references 18: 1 Russian, 17 Western [534-2791]

## CLONING IN BACILLUS SUBTILIS CELLS OF BACILLUS MESENTERICUS GENES DETERMINING SYNTHESIS OF ENZYMES FOR TRYPTOPHAN METABOLISM

Moscow GENETIKA in Russian Vol 19, No 11, Nov 83 (manuscript received 30 Nov 82; final draft received 18 Mar 83) pp 1753-1759

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[Abstract] An attempt to clone some *Bacillus mesentericus* genes coding for tryptophan synthesis in *Bacillus subtilis* cells is described and discussed. Two identical plasmids, carrying some genes of tryptophan metabolism, of *Bac. mesentericus* were constructed on the basis of plasmids pBD12 and pUB110. The intensity of growth of strains carrying these plasmids on a medium without tryptophan indicated that indol-3-glycerophosphatesynthetase and N(5'-phosphoribosyl) anthranilyl isomerase, synthesized in *Bac. mesentericus* genes in *Bac. subtilis* cells functioned rather well. The cloned genes of *Bac. mesentericus* completely replace the corresponding *Bac. subtilis* enzymes functionally. Figures 4; references 8: 2 Russian, 6 Western [534-2791]

## USE OF DELETION MUTANTS OF RP4::d3112 PLASMID FOR GENETIC ANALYSIS OF PSEUDOMONAS AERUGINOSA BACTERIOPHAGE D3112

Moscow GENETIKA in Russian Vol 19, No 11, Nov 83 (manuscript received 1 Feb 83) pp 1760-1768

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[Abstract] It is shown that the hybrid plasmid RP4::D3112 is unstable in *Escherichia coli* K-12 cells under certain conditions. Deletion mutants of this plasmid were formed at high frequency. The series pDT deletion mutants studied were all characterized by the fact that the deletions began at the plasmid-phage DNA boundary and removed various sections of the phage genome. The orderly nature of distribution of the ends of the deletions suggest that the deletions are generated by phage D3112. The deletion mutants were used for genetic mapping of phage D3112 with location of the repressor gene, three early genes and two groups of late genes. Electron-microscopy studies of RP4::D3112 DNA and its deletion derivatives showed that integration of D3112 genome in RP4 proceeds at the ends of the phage genome without permutations with loss of bacterial sequences on the right end of the DNA molecule, separated from the mature phage. It was demonstrated that transposable phages D3112 of *Pseudomonas aeruginosa* and *E. coli* Mu phage have common traits

in genome organization and in the method of integration into the host DNA.  
Figures 5; references 19: 8 Russian; 11 Western  
[534-2791]

UDC 575.1:576.851.48

PARA-AMINOBENZOIC ACID INHIBITS EXPRESSION OF INDUCIBLE 'SOS' FUNCTIONS IN  
ESCHERICHIA COLI K-12

Moscow GENETIKA in Russian Vol 19, No 11, Nov 83 (manuscript received  
9 Jun 82; final draft received 20 Apr 83) pp 1778-1785

VASIL'YEVA, S. V. and TONKAL', T. Ye., Institute of Chemical Physics, USSR  
Academy of Sciences, Moscow

[Abstract] Experimental data from this study and data from previous studies concerning the use of para-aminobenzoic acid (PABA) in experiments on chemical mutagenesis in *E. coli* indicate that PABA caused pronounced inhibition of mutagenesis,  $\lambda$  prophage induction and W-reactivation of ultra-violet irradiated phage  $\lambda$ . PABA promotes stabilization of the bacterial genome under conditions of mutagenic action. Data from this and previous studies concerning genetic control of the antimutagenic activity of PABA indicate that it is based on the capacity to inhibit development of the SOS-reparative system in the cell. PABA is the first compound from the vitamins class in which this capacity has been observed. Figures 5; references 30: 6 Russian; 24 Western  
[534-2791]

UDC 575.24.576.851.48

SELECTIVE EFFECT OF PARA-AMINOBENZOIC ACID ON MUTAGENESIS: PHENOTYPICAL  
ANALYSIS OF Arg<sup>+</sup> -REVERTANTS, INDUCED BY N-NITROSO-N-METHYLUREA IN ESCHERICHIA  
COLI K-12 AB1157

Moscow GENETIKA in Russian Vol 19, No 11, Nov 83 (manuscript received  
9 Jun 82; final draft received 20 Apr 83) pp 1916-1919

VASIL'YEVA, S. V. and DAVNICHENKO, L. S., Institute of Chemical Physics,  
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[Abstract] Specifics of mutational changes in the bacterial cell under the effect of N-nitroso-N-methylurea (NMM) were studied on the basis of phenotypical analysis of Arg<sup>+</sup>-revertants in *Escherichia coli* K-12 AB1157. The study showed that NMM induced Arg<sup>+</sup>-revertants of all four phenotypical groups. Their quantitative ratio depended on the process of DNA and protein synthesis in the cell. Sublethal concentrations of para-aminobenzoic acid reduced the frequency of induction of mutations significantly and changed

the quantitative ratio in the phenotypical groups. References 7: 2 Russian;  
4 Western  
[534-2791]

UDC 575:577.1/.4

#### ENVIRONMENTAL EFFECTS IN RECOMBINATION AS FACTOR IN EVOLUTION OF GENETIC SYSTEM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 5, Feb 84  
(manuscript received 12 Jul 83) pp 1205-1209

ZHUCHENKO, A. A., corresponding member, USSR Academy of Sciences, KOROL', A. B., PREYGEL', I. A. and BRONSHTEYN, S. I., Department of Plant Genetics, Moldavian SSR Academy of Sciences, Kishinev

[Abstract] Two and three locus model studies were conducted to evaluate the contribution of environmental factors to the recombination and cross over frequencies (rf and t, respectively). The dependence of rf and t on ecologic factors is well established in the case of higher organisms, and constitutes a key factor in the relationship between individual fitness and population-level equilibrium. Probability determinations demonstrated that a variable recombination strategy (rec-strategy), in which rf is environment-independent). Similar considerations apply to t, i.e., a variable t-strategy offers evolutionary advantages over a fixed t-strategy. Furthermore, the combination of mixed strategies for rf and t considerably expands the degree of fitness and adaptability in the process of evolution. References 11: 3 Russian, 8 Western.  
[571-12172]

UDC 619.918:582.28].015.4:[612.6.052:575.224.23

#### MYCOTOXIN INDUCTION OF SOMATIC MUTAGENESIS IN DROSOPHILA AND DNA REPAIR SYNTHESIS IN MAMMALIAN LIVER CELL CULTURES

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 7, Jul 83 (manuscript received 11 Oct 82) pp 83-86

BELITSKIY, G. A., KHOVANOVA, Ye. M., BUDUNOVA, I. V. and SHARUPICH, Ye. G., All-Union Cancer Research Institute of the USSR Academy of Medical Genetics, USSR Academy of Sciences, Moscow

[Abstract] Rapid detection is being made of genotoxic properties of carcinogens in the form of mutations and damage to DNA, which cause 85-90 percent of all carcinogenic polycyclic hydrocarbons, nitrosocompounds and other agents. The present article reports on genotoxic properties of four

mycotoxins in two test systems not previously used for the purpose. The first test was based on induction of somatic mutagenesis, the second on reparative synthesis of DNA on embryonal-human or adult-rat-liver cultures. *D. melanogaster* heterozygotes on repressive *y* and *sn*<sup>3</sup> genes of the X-chromosome were used in the study. Results showed that citrinin had no impact on fly larvae. Patulin did not affect survival or metamorphosis; it had a slight but statistically significant effect on mutation in flies. DNA repair synthesis in liver cells was initiated only by aflatoxin B<sub>1</sub> in rat liver cells, while the other mycotoxins did not have that effect even in toxic concentrations. The results are analogous to those obtained with other carcinogens tested by the authors, and facilitate tracing of the parallelism between mutagenic and carcinogenic properties of chemical compounds. References 17: 3 Russian, 14 Western.  
[569-12131]

UDC 575.29

#### SITE-DIRECTED CHEMICAL MUTAGENESIS IN PLASMID DNA AND INDUCTION OF WIDE SPECTRUM OF RECOMBINATIONS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 6, Feb 84 (manuscript received 9 Sep 83) pp 1483-1487

SALGANIK, R. I., corresponding member, USSR Academy of Sciences, DIANOV, G. L., VASYUNINA, Ye. A., OVCHINNIKOVA, L. P. and SINITSYNA, O. I., Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk

[Abstract] Studies were conducted on the wide spectrum of recombinations evolving from site-specific mutagenesis induced in plasmid pBR322 DNA in the region of the gene responsible for bacterial tetracyclin resistance. Complementary regions of the two DNA strands were modified by O-methyl-hydroxyamine or dimethyl sulfate, while the same site on a single-stranded DNA was modified with a complementary nucleotide carrying an alkylating group. Subsequent transformation of appropriate *E. coli* strains demonstrated that such site-oriented modifications of both DNA strands results in extensive deletions and insertions distant to the modified sites. However, such recombinations did not occur when only one strand of the pBR322 DNA was chemically modified. It appears, therefore, that chemical modification of even a small number of nucleotides in closely situated positions on opposite strands triggers some cellular system or systems that lead to nonhomologous recombinations, while modification of only one strand is insufficient to induce nonhomologous recombination. Figures 2; references 15: 4 Russian, 11 Western.  
[548-12172]

FORMATION OF COINTEGRATES DURING MOBILIZATION OF NONCONJUGATIVE GENETIC TRANSFER PLASMIDS BY pAP42 PLASMID

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 1, Jan 84 (manuscript received 13 Apr 83) pp 86-88

KHAMIDULLINA, R. G., GIGANI, O. B. and PEKHOV, A. P., Department of Biology and General Genetics, University of Peoples Friendship imeni Patrice Lumumba, Moscow

[Abstract] Data are presented indicating that in the process of mobilization of nonconjugative plasmids for transfer from donor E. coli cells to recipient cells of the same species by  $\Delta$  and F plasmids, physical union occurs between the F-like depressed transfer factor pAP42 and nonconjugative plasmids pACYC184 and RSF2124, as a result of which strong cointegrative structures are formed. These results indicate the formation of plasmid cointegrates similar in properties to typical R-plasmids in the process of mobilization of nonconjugative pACYC184 and RSF2124 plasmids by the conjugative pAP42 plasmid. References 6: 1 Russian, 5 Western.  
[523-6508]

PHYSICAL MAP OF TYPE 8 ADENOVIRUS GENOME OBTAINED BY RESTRICTASE ANALYSIS

Bratislava ACTA VIROLOGICA in Russian Vol 27, No 4, Jul 83 (manuscript received 10 Dec 82) pp 289-298

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[Abstract] A physical map was constructed of the type 8 human adenovirus genome. The strain Ad h 8, isolated during an outbreak of epidemic keratoconjunctivitis, was used, plus prototype strains. Viral DNA was extracted by equilibrium centrifugation in a CsCl density gradient. The DNA was split by restrictase. The DNA of Ad h 8 was compared with the genomes of other adenoviruses by horizontal electrophoresis in a gel plate. Restriction maps of Ad h 8 DNA as well as restriction maps of various other adenoviruses are presented. Since physical maps have not yet been published for other adenoviruses in subgenus D, it is impossible to determine the portion of the Ad h 8 map which can be considered specific for the subgenus. Figures 3; references 34 (in English titles)  
[510-6508]



POSSIBILITY OF INDUCING INTERTISSUE DNA SECTOR RECOMBINATION WITH HYDROCORTISONE

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 2, Feb 84 (manuscript received 15 Jul 83) pp 165-167

VASIL'YEV, V. K., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] This article tests the assumption of possible exchange of DNA fragments among different tissues in the body. Male Wistar rats were injected with  $^3\text{H}$  thymidine one time at 250  $\mu\text{Ci}/100\text{ g}$  body weight in 2 ml of 0.9 percent NaCl, pH 7.4. Nonradioactive thymidine was administered at 25 mg per 100 g body wt in 5 ml 0.9 percent NaCl, pH 7.4. Hydrocortisone and oxyurea were administered as well. The animals were decapitated. DNA was extracted from the blood and tissues and radioactivity of the DNA determined on millipore filters. The data showed that injection of hydrocortisone leads to accelerated excretion of the radioactive label from cerebral DNA, accompanied by an increase in DNA concentration in the blood plasma from 12.7 to 17.1 mg% 6 hours after administration of the hormone, decreasing to 8.9 mg% after 24 hours. It is hypothesized that labeled DNA from the blood plasma is incorporated in the DNA in the liver, though the possibility of incorporation of  $^3\text{H}$  thymidine in the DNA of the liver during reparative synthesis activated by hydrocortisone cannot be excluded. References 14: 8 Russian, 6 Western.  
[522-6508]

ENGINEERING PHYSIOLOGY--NEW AREA FOR USE OF CONTROL THEORY

Moscow IZMERENIYA KONTROL' AVTOMATIZATSIYA in Russian No 4, 1983 pp 55-63

NOVOSEL'TSEV, V. N., doctor of technical sciences

[Abstract] The basic task of engineering physiology is to study and organize the interaction of technical control systems with the physiological systems of the body to maintain its viability and working capacity. In developing the methodological bases of engineering physiology systems, the requirements of the body and nature of homeostasis must be formalized and described. The requirements for energy and substrates can be divided into primary and secondary flows, corresponding to external and internal regulation, and represented mathematically. These expressions can be used to construct models of engineering physiology systems. For example, individual protective devices, including passive isolation, active isolation and artificial flows of matter and energy, modify the demand equations of the model. A similar situation exists in medical engineering physiology, particularly with regard to auxiliary organs. Special testing of engineering physiology systems based on mathematical models is becoming more widespread, as in the evaluation of thermal protection systems for work under extremely cold conditions. The development of control algorithms, such as the one needed for an artificial pancreas, is also based on models. At the present time engineering physiology can successfully cope with the transport functions of the body but is not yet adequate for biochemical and metabolic processes. The control of medical devices for delivery of nutrients and oxygen, and removal of waste, is well developed, while control of heat producing, energetic and synthetic processes requires further research. Figures 3; references 42: 25 Russian, 17 Western.

UDC 615.373:616.993.161-078.73].012

PREPARATION AND TESTING OF LYOPHILIZED DIAGNOSTICUM FOR IMMUNOFLUORESCENT  
DIAGNOSIS OF VISCERAL LEISHMANIASIS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4,  
Jul-Aug 82 (manuscript received 23 Jun 81) pp 50-52

TITOVA, I. V. and GRACHEVA, L. I., Institute of Epidemiology and Microbiology  
imeni Academician N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Details are described on the preparation of a lyophilized antigen of *Leishmania donovani* and testing in indirect immunofluorescence. The essential steps included harvesting a 6-8 day old culture of *L. donovani* promastigotes grown on a synthetic medium, preparation of a suspension containing  $50 \times 10^6$  cells/ml by centrifugation, treatment with 0.1 percent formalin, and lyophilization with 0.5 percent sucrose and 0.5 percent bovine albumin. Analysis of 1832 human serum samples showed that the results obtained with the lyophilized and native diagnosticum were identical in terms of positives, with the advantage that the lyophilized preparation was easier to work with and store. An additional advantage was that lyophilization preserved the antigenic characteristics of leishmania for at least a year and did not require special storage conditions. The liquid diagnosticum retained activity for only 1 month at 4°C, and for 6 months at -20°C. These studies indicate that the lyophilized antigen, prepared in the manner recommended, offers definite advantages in the application of the indirect immunofluorescence technique to the diagnosis of leishmaniasis and in epidemiologic surveillance. References 12: 5 Russian, 7 Western.

[560-12172]

SEROLOGIC STUDIES ON ZOONOTIC CUTANEOUS LEISHMANIASIS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 6, Nov-Dec 83 (manuscript received 24 Feb 83) pp 25-29

SHUYKINA, E. Ye., KHUSEYNOVA, Kh. Kh., PASSOVA, O. M., PONOMAREVA, A. M. and TRIYERS, I. I., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow; Turkmen Scientific Research Institute of Skin Diseases, Turkmen SSR Ministry of Health, Ashkabad; Central Order of Lenin Institute for the Advanced Training of Physicians, USSR Ministry of Health, Moscow

[Abstract] Studies were conducted on the serologic status of several hundred patients with cutaneous leishmaniasis contacted from animals, immunized individuals, and hyperimmune individuals, utilizing agglutination, Ouchterlony immunodiffusion, immunofluorescent and enzyme-labeled antibody techniques. Only isolated individuals presented with serologic evidence of humoral antibodies against the causative organism: of the 207 patients that were examined only 3 gave a positive immunofluorescence test (2 with titers of 1:50 and 1 with 1:100); all of the 132 vaccinated subjects were negative by immunofluorescence (2 of 56 sera examined by the enzyme technique were weakly positive (1:200)). In addition, 8 immunized and reimmunized volunteers were negative, as was a control group of 237 clinically healthy donors. However, a high incidence of seropositive results with various promastigote forms indicates that care must be exercised in the interpretation of serologic results to guard against false-positives. References 15: 11 Russian, 4 Western

[561-12172]

SPECIFICITY OF LYOPHILIZED LEISHMANIA ANTIGEN IN IMMUNOFLUORESCENCE

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 6, Nov-Dec 83 (manuscript received 15 Dec 82) pp 29-33

SAF'YANOVA, V. M., TITOVA, I. V. and GRACHEVA, L. I., Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences

[Abstract] Rabbit antisera, elicited by immunization with lyophilized and native preparations of antigens derived from the same strain of *Leishmania donovani*, were used in indirect immunofluorescent studies for assessment of cross-reaction with antigens obtained from various trypanosomatids (including seven species of New and Old World *Leishmania*, *Leptomonas* and *Crithidia*).

Both the lyophilized and native antigens gave essentially identical results and demonstrated Leishmania group specificity; however, they could also be used to differentiate between the New and Old World species. Unambiguous, negative reactions were obtained with Leptomonas pessoai antigens in all cases, but weakly positive reactions were obtained between Crithidia luciliae and Old World mammalian leishmania sp. The lyophilized antigen was also useful in differentiation between the mammalian species and reptilian species (L. adleri, L. gymnodactyli). References 14: 9 Russian, 5 Western [561-12172]

UDC: 615.373:616-008.939.624-097-078:73:661.183].012.6

SYNTHESIS OF HIGH CAPACITY IMMUNOSORBENT WITH ORIENTED IMMOBILIZATION OF Fab<sup>1</sup> FRAGMENTS FOR ANTIGEN EXTRACTION

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 2, Feb 84 (Manuscript received 23 Mar 83) pp 179-180

SKVORTSOV, V. T. and GURVICH, A. Ye., Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Various carriers such as sepharose are used for the production of immunosorbents. However, antibody molecules bonded with the matrix are oriented in a disordered manner in these immunosorbents, so that only one of four active centers can react with the antigen. The authors attempted to eliminate this shortcoming by oriented attachment of antibody fragments at the thiogroup, which is always at the opposite end of the active center. This has become possible since the development of methods of specific attachment of thiol-containing molecules to a matrix by thiol-disulfide exchange. The method allows the production of an immunosorbent in which the capability of the active centers of the antibodies to bond with the antigen is practically completely used. Figure 1; references 10: 2 Russian, 8 Western [522-6508]

## LASER EFFECTS

UDC 617.7-007.681-021.3-089:615.849.19

### LASER IRIDECTOMY IN PRIMARY GLAUCOMA (LONG-TERM OBSERVATION)

Moscow VESTNKI OFTAL'MOLOGII in Russian No 1, Jan-Feb 84 (manuscript received 19 May 83) pp 19-22

AKOPYAN, V. S., DROZDOVA, N. M. and LITVINOVA, G. G., candidates in medical science, All-Union Scientific Research Institute of Eye Diseases, USSR Ministry of Health

[Abstract] Long-term observation of 1,149 patients (1,856 eyes) with primary glaucoma after laser iridectomy is reported. Single pulse ruby, combined and layered argon laser iridectomy methods were used, depending on the congenital and acquired characteristics of the iris. In functional or predominantly functional glaucoma, laser therapy led to normalized intraocular pressure (IOP) either without (40-64 percent of patients) or with miotic drugs. Of the patients using miotics, increased IOP was noted in 8 percent after 1 1/2 to 4 years, and was treated with stronger medication. In primary closed-angle glaucoma with predominantly synechial blockade, laser therapy was not effective and surgery was required. After 6 years, 22 percent of the iridectomy patients with composite glaucoma (functional block and damaged drainage) had required surgery. In 24 patients with glaucoma in 1 eye, whose other eye was anatomically predisposed to glaucoma, laser therapy was used and no pathological changes were seen after 2-7 years. Pigmented adhesions were noted in 11-24 percent of the patients requiring surgery after laser therapy, but not in those subjected only to single pulse ruby laser iridectomy. The formation of pigmented adhesions is a result of the thermal component of the argon laser. Initial corneal opacity was seen in 15 percent of the patients before laser therapy and 41 percent of the patients 5-9 years after treatment. The data confirm the substantial effectiveness of laser iridectomy. References 12: 6 Russian, 6 Western  
[465-12126]

ROLE OF STATIC PERIMETRY IN EVALUATION OF DYNAMICS OF GLAUCOMATOUS PROCESSES  
AFTER LASER TREATMENT

Moscow VESTNIK OFTAL'MOLOGII in Russian No 6, Nov-Dec 83 (manuscript received  
3 Oct 82) pp 9-12

KAZAKOVA, Ye. L. and AKOPYAN, V. S., candidate in medical sciences, All-  
Union Scientific Research Institute of Eye Diseases, USSR Ministry of Health

[Abstract] The use of selective static perimetry (the Armaly-Rock method) to evaluate the effectiveness of laser treatment was studied in 34 patients (34 eyes) with primary open-angle glaucoma. In these patients, laser cyclotrabeculospasms or laser trabeculoplasty resulted in ophthalmotonus compensation. Before treatment, enlarged blind spots were found in 26.5 percent of the cases, paracentral scotoma in 23.5 percent, arcuate scotoma in 32.4 percent, defects in the temporal portion of the visual field in 32.4 percent and nasal steps in 52.9 percent. During the first 3 months after laser therapy, both positive and negative results were noted. However, when intraocular pressure stabilized and was compensated, after 3 to 6 months, normalization of the visual field was seen in 18 patients and improvement in 11 patients. Results of campimetry corresponded to those obtained using the simpler static perimetry, while results of isopterperimetry were subjective. The data indicate that selective static perimetry is a sensitive method which can be used independently to evaluate glaucomatous defects in the field of vision, with greater accuracy than with kinetic methods. Figures 2; references 9: 3 Russian, 6 Western  
[466-12126]

UDC 612.021.5+616.3

INFLUENCE OF HELIUM-NEON LASER RADIATION ON VASCULAR-NERVE TISSUE STRUCTURES  
IN CAT SMALL INTESTINE

Moscow BIOLOGICHESKIYE NAUKI in Russian No 12, Dec 83 (manuscript received  
29 Apr 82) pp 47-50

DEL'TSOVA, Ye. I., NEYMAN, A. M. and SHIYAN, O. A., Ivano-Frankovsk Medical  
Institute

[Abstract] Experiments were performed on 15 mature domestic cats of both sexes of approximately the same age and weight. The animals were irradiated with laser radiation, at 25 mW/cm<sup>2</sup> from a distance of 15 cm, light-spot diameter 1.0 cm, exposure 6 minutes. The light was shined onto shaved skin on the abdomen, 2 minutes on each of 3 spots. There were 15 radiation sessions, one each week. The animals were sacrificed on the day of the last radiation session, 30 or 45 days later. The laser beam was found to influence vascular, nervous and tissue components of the intestinal wall, with

the greatest response in the blood vessels. Immediately after the course of radiation there was expansion of the arterial element of the microcirculatory bed and some constriction of the venous portion. By days 30 and 45, the lumens of the arterioles and precapillaries narrowed, while those of the capillaries, postcapillaries and venules expanded. The expanded microhemovessels of the nerve ganglia were well filled with the injection mass, the vascular picture of the capillary loops was denser. The capacity of the microcirculatory bed of the nervous ganglia was statistically reliably greater. The results thus indicate that helium-neon laser radiation, the action of which is based on mechanical, physical and chemical effects, has a stimulating influence on the structures of the wall of the small intestine. The changes are persistent and were observed for a period of 45 days after completion of radiation. Figure 1; references 21: 20 Russian, 1 Western [551-6508]



UDC 576.8

NEW EXTREMELY ACIDOPHILIC SULFUR-OXIDIZING MICROORGANISM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 6, Feb 84  
(manuscript received 25 Aug 83) pp 1488-1490

GOLOVACHEVA, R. S., Institute of Microbiology, USSR Academy of Sciences,  
Moscow

[Abstract] An aerobic, nonsporogenous, Gram negative bacterium has been isolated from the hydrotherm of the Uzon volcano caldera, which oxidizes elemental sulfur to sulfuric acid in the presence of 0.01-0.02 percent yeast extract. Growth has been observed in the temperature range of 50/55° to 83/87°C, with a maximum between 70 and 75°C, while the optimum pH range is between 2.0 and 3.0. During sulfur oxidation, formation of sulfuric acid results in a pH of 1.5-1.0 with no adverse effects on this bacterium. The morphology is that of cocci; however, the extremely plastic cell wall, typical of archaebacteria in its lack of muramic acid, allows for oval forms and other deformations under physical stress. Multiplication appears to occur by binary fission as well as by budding. In general, although similar in some respects to *Sulfolobus* sp. and *Thermoplasma* sp., the organism in question appears to constitute a separate genus. Figures 2; references 11: 1 Russian, 10 Western  
[548-12172]

UDC: 579.842.11:579.252.5]04.615.33

STUDY OF INCOMPATIBILITY PROPERTIES OF pKMR PLASMIDS DETERMINING ANTIBIOTIC RESISTANCE AND ABILITY TO PRODUCE COLONIZATION ANTIGENS

Moscow ANTIBIOTIKI in Russian No 2, Feb 84 (manuscript received 20 Apr 83)  
pp 91-95

DOROKHINA, O. V. and KOROTYAYEV, A. I., Kuban Medical Institute, Krasnodar

[Abstract] pKMR plasmids from natural strains of enterobacteria taken from patients with acute intestinal infections were studied. The resistance of

the bacteria to antibiotics and sulfanilamine was determined by the method of serial dilutions of antibiotics in agar. The presence of adhesive factors was judged from the capability of strains of *E. coli* carrying the pKMR plasmids to agglutinate human erythrocytes in blood groups A, B, AB in the presence of D-mannose. The incompatibility properties of the pKMR plasmid samples were studied by the Datta method. Based on results obtained it is suggested that the incompatible plasmids pKMR 207-1, pKMR 208-1, pKMR 210 and pKMR 212 all belong to the IncFi incompatibility group. These plasmids control both antibiotic resistance and the capability to synthesize colonization antigen. The plasmids pKMR 209, pKMR 207-1, pKMR 208-1, pKMR 210 and pKMR 212 are compatible and belong to another incompatibility group. References 6: 1 Russian, 5 Western [575-6508]

UDC 617-001.4-089.81(049.2)

SURGICAL TREATMENT OF PEACETIME WOUNDS

Moscow ORTOPEDIYA TRAVMATOLOGIYA I PROTEZIROVANIYE in Russian No 2, Feb 84

[Article by V. V. Chaplinskiy, G. G. Chekhovich and E. I. Popik of the Department of Traumatology, Orthopedics and Military Field Surgery (director-- Prof V. V. Chaplinskiy), Lvov Medical Institute and Clinical Hospital No 8, Lvov]

[Text] The urgency of publishing K. P. Kuz'min's article "What Must One Understand in Primary Surgical Treatment of Wounds?" (4) [this journal, No 1, 1982, pp 65-66] is shown by the discussion presented in the journal "Ortoped. Travmatol." (1, 3, 6, 7, 10). It deals with terminology and content of primary surgical treatment (PST) of wounds. Joining in the discussion, we first of all will allow ourselves to ask, "Why, on the basis of an analysis of peacetime material, is the matter precisely about PST of wounds and not about surgical treatment (ST) of wounds?" Is the word "primary" necessary? After all, not one of the authors taking part in the discussion mentions "secondary" ST. Isn't it because in peacetime, when ST is conducted properly, utilizing all the scientific achievements of recent years, secondary ST, as a rule, is excluded or is conducted very seldom? The question is more of eliminating complications due to defects allowed during PST and not of secondary ST, when conducting only lancing of swellings, supplementary draining, etc.

In our opinion, the term "PST" is especially urgent during massive admissions of the wounded in wartime. Therefore, we agree with the authors, who consider the given question "routine" (1), having to do with "truths known and formed long ago" (10). The essence of PST, developed in the experience of two world wars, remains a stable position of military-medical doctrine and hardly belongs to the discussion without a consideration of a supplementary analysis of the post-war experience of medical security of local military ventures in recent years.

An analysis of data of the authors participating in the discussion reveals completely opposite points of view concerning the content of the term "PST" of wounds. We must agree with K. P. Kuz'min (4) in that "advances in surgery over the past decade have considerably enriched and complicated this operation"

in the sense of many developments according to plan. However, it should be stressed that its final goal is not only prevention of wound complications, but also maximum reduction in the periods of anatomical and functional restoration of harmed tissues. This great amount of development according to plan is also determined by the multi-component nature of surgical intervention, during which the removal of a main component, even something like the removal of nonviable tissues, cannot be considered a leading one. This is incorrect, from both a methodological and a tactical point of view, since the significance of separate components of intervention change in relation to the type and nature of the wound and other factors. Citations presented in the discussion articles of different authors also demonstrate this; they show that, in some instances, cutting of tissues is most significant, and in others, carving of tissues is, etc. Incidentally, not one of the mentioned articles fully illuminated such important questions as the carving of non-viable tissues and removal of foreign bodies with an account of recent surgical advances. The introduction of different methods of cleansing wounds (3) and vacuuming (5), ultrasonic cavitation (2, 8) and adjusting post-operational irrigation systems with antibacterial drugs (with active and passive draining) have substantially supplemented the process of cleaning wounds and have made it dynamic, which is especially important when treating bullet wounds and contusions, where the limits of tissue viability are impossible to determine.

Thus, our experience has specifically shown that supplementing ST with just one ultrasonic cavitation with antibacterial drugs (2, 11), with subsequent vacuuming (5), makes the removal of "small secondary bone and metal fragments lying deep in soft tissues" (10) possible, which is really not achieved when using only a scalpel. Therefore, V. F. Trubnikov and coauthors (10) are correct in prohibiting even "attempts at their removal." It is known to be impossible to "sterilize a wound" with only a knife. Incidentally, even one vacuuming, in microtraumas for example, is related to a number of important methods of combined prophylaxis of tetanus (12).

A few words about the equal significance, in ST of wounds, of employing its other composite components, in particular, ones such as dressing of wounds, reposition and immobilization of bone fragments in fractures, repair of tendons, vessels, nerves, bone plastic (with defects) and, finally, the application of constant wound irrigation for continuation of treatment in the post-operation period (Seppo needles and other equipment). It is unbelievable that some authors consider questions of tissue restoration to be unspecific for ST and have made it possible to move them to the second plan (3) and even to turn over immobilization to other people (7). Whereas, such tactics were allowed during the war, with its massive inflow of wounded--when new, above-mentioned physical-chemical elements of ST, apparatus-osteosynthesis, etc., were still lacking--then, such an existence, how, of two stages cannot promote either a lessening of work incapacity time, or a reduction of invalidity. The existence of two stages in peacetime is permissible only in a forced situation: severe damage to the bone (13), the patient being in a state of shock, or, lack of conditions for qualified performance of ST and, then, after preliminary application on the wound of preserving antibacterial bandages, with dimethylsulfoxide (5).

We are convinced that formal searches for a leading component of the operation are not a contribution to the future improvement of ST results, but an organizational solution to questions of maximum reduction in time periods from the moment of trauma to conduction of qualified intervention. Unfortunately, not one author who participated in the discussion touched upon the question of who must perform ST and where it must be completed.

Our experience shows that ST of small cut wounds (with glass, for example) in the projection of wrist tendons should not be conducted by the physician on duty at the trauma center or polyclinic. Such patients should be sent to the specialized department immediately. This is a reliable way of preventing diagnostic errors, when uninformed physicians sew up only the skin (over impaired tendons which cannot be diagnosed before an operation) or sew them together poorly (for example, without employing blocking stitches). If there is no possibility of performing quick, comprehensive, final ST, particularly at night, then it is better to use the above-mentioned bacteriostatic bandage with subsequent immobilization and to postpone specialized surgical aid.

A case of complications after PST in an open shin wound (10) is well illustrated by the position presented above on the equal significance of all ST components, which were unfortunately not used on the mentioned patient. Otherwise, the outcome would have undoubtedly been different. In our conditions, we make a wide cut of the wound and examine it. It is desirable to accompany this with constant flushing with antibacterial preparations and obligatory ultrasonic cavitation. Our 10-year experience has shown that, in a number of cases, this does not lead to complete sterilization of wounds (which is indicated by the results), but it significantly reduces the amount of microbes (always lower than the level of  $1.10^2/1$  g tissue) and, which is no less important, it eliminates their germinative properties. Since they are incapable of reproduction, the microbes die (11). Further vacuuming or repairing of the constant draining system "inflow-outflow" provides smooth healing in conditions of reliable immobilization of the extremities and preliminary overlapping with soft tissues of the fracture spot.

Fragments seen in the wound (which we treat carefully, like skin, in contrast to maximum carving of hypodermic tissue and radical--of muscles) should be juxtaposed and secured transversely with needles. When there is a defect in soft tissue, we overlap the fracture spot with a thick, dislocated skin-muscle piece. We leave the formed gaping lateral wounds to constantly drain. When there is a smooth flow, we cover them with a free piece of skin. Conditions for primary simultaneous skin plastic surgery, conducted along with leaving an active suction, are encountered very rarely.

We consider the second necessary element of immobilization in the case of open bone fractures of the shin or hip to be stitches for skeletal extension, and the third--applying a plastic splint.

In all cases of open fracture, with the exception of timely contraindications (for example, due to the severity of the patient's over-all condition), the method of choice is ending ST by utilizing stable apparatus osteosynthesis.

This not only ensures prevention of infection and smooth healing of the easily observed wound, but it also creates optimum conditions for an early use of a complex of restorative rehabilitation methods.

Thus, ST of a wound is really systematic, multi-component complex operative intervention, which is intended not only to ensure smooth flowing of the wound, but also the quickest anatomical and functional restoration of harmed tissues. This is why the operation in which all components have interconnected meaning must be performed mainly by prepared specialists.

Now, the question arises of organizing (if only in oblast academic cities) specialized centers for treating open wounds and wrist surgery, guaranteeing them with results of contemporary advances in science and technology (gnoto-biology, GBO-therapy [expansion unknown], microsurgery, operations with EOP [expansion unknown] and others). In such centers, it would be possible to constantly increase the qualifications of physicians.

Considering that the quality of ST is a pivotal question concerning operative treatment of open wounds for the unification of an account of its efficiency, we believe it would be expedient to develop and introduce one form of calculation of ST results, introducing into it implication (or algorithms for machine processing) of the statistical data enumerated above of all components of this operation.

Thus, we consider that the basic deficiency of the cited work of the authors who participated in the discussion is the fact that their work does not clearly differentiate between the essence of PST of wounds in war and peacetime. In this article we specifically dealt with ST of peacetime as insufficiently illuminated in the discussion, when taking advances of recent years into account.

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NONIONIZING ELECTROMAGNETIC RADIATION EFFECTS

UDC 616.831-008.1-02:616.133-089.814-092.9]-085.849.11-07:[616.831-008.939  
.633.2+616.831.31-092:612.833.81

BILATERAL CAROTID LIGATION AND EFFECTS OF ELECTROMAGNETIC FIELD ON CONDITIONED  
REFLEX RETENTION AND CEREBRAL NUCLEIC ACID LEVELS

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 5,  
May 83 (manuscript received 14 Sep 82) pp 62-64

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[Abstract] An analysis was made of the retention of an avoidance conditioned reflex, the clinical status and brain stem and cerebral cortical levels of DNA and RNA in outbred rats subjected to bilateral carotid ligation and subsequent exposure to decimeter-wave electromagnetic field (EMF: 460 MHz, 80 mW/cm<sup>2</sup> to the head for 3 min). Ligation of the carotids led to deterioration of the conditioned response, with further decrease in performance seen in animals subjected to the EMF within 2 h of operation. Re-exposure to EMF after 2 days actually improved performance on the avoidance test in some rats, but in the majority (63.6 percent) marked clinical deterioration was seen which terminated in convulsions and death. Exposure of unoperated control animals to EMF (3 min/day for 6 days) was without effect. Biochemical studies showed that EMF potentiated DNA and RNA synthesis in the brain stem to above-control levels. In the cerebral cortex EMF-induced RNA synthesis exceeded slightly the control level, while DNA synthesis increased to an intermediate level between unoperated controls and ligated, but unirradiated, animals. These findings point to the considerable individual variability in the responses of animals to EMF, and suggest that caution be exercised in the use of EMF for the treatment of carotid insufficiency in humans. Figures 1; references 11: 10 Russian, 1 Western  
[570-12172]



## TIME-DEPENDENT SPINAL CORD CHANGES FOLLOWING NONIONIZING MICROWAVE IRRADIATION

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 5,  
May 83 (manuscript received 13 Apr 82) pp 98-100

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[Abstract] Histopathological studies were conducted on the spinal cords of dogs and cats subjected to nonionizing microwave irradiation (12.6 cm wavelength, 400-500 mW/cm<sup>2</sup>). Sequential studies covering days 1 to 30 showed that the change in both species were analogous despite differences in duration of exposure (1 h in cats and 4 h in dogs), with initial changes evident within a day of the insult. In general, the chief features were dystrophic changes and destruction of the neurons and neuroglial activation. The changes were progressive and by day 10 more than 50 percent of the neurons had been destroyed, while the initial hyperplasia of the glial elements was replaced by degenerative changes. Synaptic structures were also affected and underwent progressive dissolution, with the synapses on the larger motor neurons being somewhat more refractory to destruction. By analogy, the histopathological findings observed in the experimental animals can be correlated with clinical findings in humans exposed to microwave irradiation. Figures 4; references 11: 9 Russian, 2 Western [570-12172]

UDC: 538.311:578.08

## EFFECT OF CONSTANT AND LOW-FREQUENCY MAGNETIC FIELDS ON BIOLOGICAL SYSTEMS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIA BIOLOGICHESKAYA in Russian No 6,  
Nov-Dec 83 (manuscript received 24 Apr 83) pp 805-821

PIRUZYAN, L. A. and KUZNETSOV, A. N., Institute of Chemical Physics, USSR Academy of Sciences, Moscow, Scientific Research Institute for Biological Testing of Chemical Compounds, Kupavna

[Abstract] The biological effect of constant and low-frequency magnetic fields has formed the subject of a combined study by the two institutes of the authors since 1980. This report presents information on the course of this work, discusses some results of the studies performed and future prospects. The studies have been performed at various levels of organization of biological and model systems. Most of the experiments have used electromagnetics with a high degree of stability and field homogeneity. The studies performed to date have indicated primarily that magnetic fields do have an effect on some biological systems under some conditions. (The large numbers of negative results have also demonstrated that there is as yet no accurate understanding of the mechanisms of action of such fields.) The

liquid crystal hypothesis and the "spin block" hypothesis remain the strongest contenders for explanation of the biological effects, although they do not exclude other possible mechanisms. The weak nature of the effects found in comparison to chemical and other effects forces great caution in the performance of experiments. References 71: 57 Russian, 14 Western [564-6508]

UDC: 547.963.3

#### DISSOCIATION OF AMINO ACID-DNA COMPLEXES UNDER INFLUENCE OF LONG-WAVE UV LIGHT

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIA BIOLOGICHESKAYA in Russian No 6, Nov-Dec 83 (manuscript received 30 Nov 81) pp 925-928

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[Abstract] A study is presented of the influence of UV light with wavelength at least 310 nm on model DNA-tyrosine, DNA-tryptophan and DNA-histidine complexes, to determine changes in the structure of DNA when these model complexes are irradiated. Sheep-thymus and rat-spleen DNA preparations were utilized in the study. The aminoacid concentration was determined by reaction with ninhydrin after preliminary dialysis. DNA solutions and model complexes were irradiated in an NaCl-citrate buffer. Structural changes caused by the UV light were studied by means of a spin-labeled dye method. It was found that an external electrostatic complex type dissociates under the experimental conditions, an internal complex type being resistant to the radiation and apparently responsible for the specific effect of the exposure--sensitization in the case of formation of DNA complex with tyrosine or tryptophan and protection from UV light upon formation of a complex with histidine. Figures 4; references 8: 4 Russian, 4 Western [564-6508]

UDC 577.3:611.1

#### REACTIONS OF CEREBRAL CORTEX NEURONS TO ALTERNATING MAGNETIC FIELD ON GLUTAMIC ACID

Moscow BIOLOGICHESKIYE NAUKI in Russian No 1, Jan 84 pp 52-54

SOLDATOVA, L. P. and UDINTSEV, N. A.

[Abstract] A study was made of the possibility of preventing or reducing morphologic damage to cerebral cortex neurons caused by exposure to magnetic fields by preliminary administration of glutamic acid. Preliminary administration of sodium glutamate to white rats was found to significantly reduce

damage to cortical neurons caused by exposure to an alternating magnetic field of 20 mT in tests with 5-times exposure for 6.5 hours. The male white rats used received sodium glutamate subcutaneously at 1 mg per g of body mass. Pathomorphologic changes in neurons are illustrated by photomicrographs. The protective effect of the sodium glutamate is associated with its properties as a general adaptogen, as well as its ability to regulate the metabolism and status of the neuroendocrine system. Glutamic acid and its related metabolites apparently regulate energy metabolism and ion-electrolyte balance, decreasing edema and vacuolization of cortical neurons. Figures 2; references 11: 8 Russian, 3 Western  
[528-6508]

UDC: 615.015.1:538.5

#### INFLUENCE OF MICROWAVE ELECTROMAGNETIC RADIATION AND CERTAIN HORMONES ON OSMOTIC RESISTANCE OF MOUSE ERYTHROCYTES

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 1, Jan 84 (manuscript received 22 Apr 83) pp 51-52

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[Abstract] A study was made of the influence of hydrocortisone, adrenalin and corticotropin on the erythrocyte osmotic resistance of mice exposed to microwave radiation. The microwave irradiation (described earlier, Bernauer 1981) was administered daily for 8 min for 12 days, intensity  $62 \pm 5$  mW/cm<sup>2</sup>, frequency 2374 MHz. Experiments were performed on 594 white mice of both sexes in spring. Groups of mice received adrenalin, hydrocortisone or corticotropin every other day for 12 days. Erythrocyte osmotic resistance was determined on days 2, 4, 6, 8, 10, 12 and 17 of the experiments, 30 minutes after microwave irradiation or administration of the substances. No significant difference in osmotic resistance was observed between healthy and control mice, and the use of the hormones alone had no significant influence on osmotic resistance of erythrocytes in nonirradiated mice. Mice receiving radiation and isotonic NaCl solution showed an increase in  $T_{50}$  during the first 6 days by a factor of 1.25-1.30. Mice receiving hydrocortisone and corticotropin showed less change in osmotic resistance,  $T_{50}$  increasing by only 15 to 17 percent by the 8th day of the experiment. Adrenalin had a similar influence, though weaker than that of hydrocortisone. Figure 1; references 13: 8 Russian, 5 Western.  
[528-6508]

UDC 615.918:582.28].022.30.015.4:616.008.931

ENZYMATIC ASSAY OF SUBACUTE EFFECT OF LOW DOSES OF T-2 TOXIN

Moscow GIGIYENA I SANITARIYA in Russian No 12, Dec 83 (manuscript received 21 Apr 83) pp 27-28

[Article by L. I. Avren'yeva, V. S. Sobolev, L. B. Kravchenko and V. A. Tutel'yan, Institute of Nutrition, USSR Academy of Medical Sciences, Moscow]

[Text] Hygiene specialists have recently focused particular attention on the issue of secondary metabolites of microscopic fungi--mycotoxins, distinguished by their high toxicity; many also have carcinogenic, mutagenic and teratogenic properties (L. V. Kravchenko and V. A. Tutel'yan; Pitt; Mycotoxins). Among the mycotoxin producers which are widely spread in nature, including temperate and cold climate zones, are microscopic fungi of the genus *Fusarium*. It is assumed that the toxigenic strains of, namely, *Fusarium sporotrichiella* cause in people the grave illness alimentary toxic aleukia (A. A. Pokrovskiy, et al.). Experiments conducted in our laboratory have shown that microscopic fungi of this species are producers of mycotoxins of the trichothecene group, of which, one of the main representatives is toxin T-2 (V. S. Sobolev et al.).

T-2 toxin is classified chemically with the sesquiterpenes and produces marked toxicity and affects primarily hemotopoietic and immunocompetent organs (Sato et al.). In addition to that there is little information about the biochemical manifestations of mycotoxin toxicity. In our past experiments, it was determined that T-2 toxin, in a dose equal to the LD<sub>50</sub>, causes an early and sharply pronounced change in the activity of a group of organelle-specific enzymes (L. V. Kravchenko et al.).

The danger of T-2 toxin to the health of man and farm animals mandates its hygienic regulation in foodstuffs and feeds. In connection with this, it is particularly important that specific biochemical methods be sought to assay the toxic action of the mycotoxin.

In this article, an attempt is made to study the effect of low doses of T-2 on organelle-specific enzymes of liver, spleen, thymus, as well as of the blood serum of rats. Toxin T-2 was isolated in crystalline form from grain contaminated with *Fusarium sporotrichiella* fungi strain No 53315 (V. S.

Sobolev et al.). The structure of the toxin was determined by mass spectrometry. The experiment was conducted on male rats of the Wistar strain with an initial weight of 120+/-2 gm. For 5 weeks, the animals received, six times per day, an intragastric solution of crystallized T-2 toxin in a dose corresponding to one-seventh (1/7) the LD<sub>50</sub> (0.54 mg/kg).<sup>\*</sup> For a solvent, we used a 1 percent aqueous solution of ethanol. The total amount of the toxin received by each animal amounted to 16 mg/kg. The rats were killed by decapitation 72 hours after the last administration of the toxin. Tissue homogenates were prepared according to generally accepted methods.

In the homogenates of liver, spleen, thymus and blood serum, we measured the activity of the lysosomal marker enzymes--β-glucosidase (Enzyme Nomenclature 3.2.1.21), β-N-acetylglucosaminidase (EN 3.2.1.30), α-mannosidase (EN 3.2.1.24), mitochondrial--succinate dehydrogenase (EN 1.3.99.1), microsomal--glucose-6-phosphatase (EN 3.1.3.9), and plasma membrane--alkaline phosphatase (EN 3.1.3.1). In blood plasma, we also measured the activity of ketose-1-phosphataldolase (EN 4.1.2.7). Enzyme activity was determined by spectrophotometric and spectrofluorometric micromethods, based on the ultramicrosystem of biochemical analysis (A. A. Pokrovskiy and V. A. Tutel'yan). The introduction of toxin T-2 did not produce clinical symptoms of intoxication. Only toward the end of the experiment, some loss of body weight was observed in the experimental animals as compared to the control group and a tendency toward an increase in the relative mass of the spleen.

The results of the study of the general activity of enzymes in rat liver, spleen, thymus and blood plasma are presented in the table. As can be seen from the obtained data, T-2 toxin, even in low doses, led to a significant change in the enzyme profile of the organs and blood plasma; the differences in character of the change in enzymatic activity were pronounced. In the liver, selective activation was noted of lysosomal acid hydrolases--β-glucosidase and α-mannosidase (212 and 156 percent as compared with the control level, respectively). In the spleen and thymus, in contrast to the liver, some lowering of lysosomal enzyme activity was observed at a time when the activity of alkaline phosphatase in the spleen and especially the thymus definitely increased and amounted to 120 and 163 percent, respectively, compared to the control. It is very significant that a marked reduction of alkaline phosphatase activity was revealed in blood plasma (55 percent of the control).

By comparing these data with the results of an experiment concerning the study of acute T-2 toxicosis (L. V. Kravchenko et al.), differences in the enzymatic change in the studied organs were established. It was revealed that a daily administration of T-2 toxin in low doses principally brings about an activation of lysosomal liver enzymes and reductions in the spleen and thymus. In contrast to this, a single administration of toxin T-2 in a dose equal to the LD<sub>50</sub> was accompanied by activation of acid hydrolases in the target organs (spleen and thymus) and a definite decrease of their

<sup>\*</sup>The authors express their gratitude to I. V. Dmitriyeva for her assistance on this part of the experiment.

Table. Effect of Subacute Intoxication by Toxin T-2 on Enzyme Activity in the Liver, Spleen, Thymus and Blood Serum in Rats

(1) Фермент	Печень (2)		Селезенка (3)		Тимус (4)		Сыворотка крови (5)	
	контроль а)	опыт б)	контроль а)	опыт б)	контроль а)	опыт б)	контроль а)	опыт б)
(6) $\beta$ -Глюкозидаза**	5.6 $\pm$ 0.3	11.9 $\pm$ 1.6*	6.8 $\pm$ 0.7	6.5 $\pm$ 0.3	6.2 $\pm$ 0.6	4.8 $\pm$ 0.4	—	—
(7) $\beta$ -N-Ацетилглюкоза-минидаза**	554.0 $\pm$ 44.4	615.2 $\pm$ 34.7	204.6 $\pm$ 12.6	172.4 $\pm$ 4.7*	129.2 $\pm$ 8.5	117.2 $\pm$ 5.8	1.95 $\pm$ 0.13	1.75 $\pm$ 0.11
(8) $\alpha$ -Маннозидаза**	27.5 $\pm$ 2.3	42.8 $\pm$ 4.4*	51.2 $\pm$ 8.2	38.7 $\pm$ 2.5	12.0 $\pm$ 0.8	9.3 $\pm$ 0.5*	0.42 $\pm$ 0.03	0.42 $\pm$ 0.02
(9) Суцинатдегидрогеназа**	2.00 $\pm$ 0.14	2.03 $\pm$ 0.10	0.26 $\pm$ 0.01	0.29 $\pm$ 0.03	0.37 $\pm$ 0.01	0.39 $\pm$ 0.02	—	—
(10) Глюкозо-6-фосфатаза**	2.06 $\pm$ 0.09	2.04 $\pm$ 0.12	0.66 $\pm$ 0.04	0.66 $\pm$ 0.09	—	—	—	—
(11) Шелочная фосфатаза**	0.75 $\pm$ 0.02	0.77 $\pm$ 0.03	0.96 $\pm$ 0.05	1.15 $\pm$ 0.08	1.03 $\pm$ 0.06	1.68 $\pm$ 0.03*	0.20 $\pm$ 0.02	0.11 $\pm$ 0.01*
(12) Кальций-1-фосфатаза**	12.6 $\pm$ 0.3	12.3 $\pm$ 0.2	—	—	—	—	0.21 $\pm$ 0.04	0.22 $\pm$ 0.02

Key:

1. Enzyme
2. Liver
3. Spleen
4. Thymus
5. Blood Serum
6.  $\beta$ -glucosidase\*\*
7.  $\beta$ -N-acetylglucosaminidase\*\*
8.  $\alpha$ -mannosidase\*\*
9. Succinatedehydrogenase\*\*\*
10. Glucose-6-phosphatase\*\*\*
11. Alkaline phosphatase\*\*\*
12. Ketose-1-phosphataldolase\*\*\*\*
- a) control
- b) experimental

Note: Presented are the average ( $\bar{X} \pm S \bar{x}$ ) results of five experiments. One star represents  $P < 0.05$  (the remaining cases,  $P > 0.05$ ); two stars indicate activity in micromoles/part for 1 ml of blood serum; three stars, activity in micromoles/minute for 1 gm of tissue or 1 ml of blood serum; four stars indicate activity in micromoles/minute for 100 ml of blood serum.

activity in the liver. The demonstrated rise in lysosomal liver enzymes activity in this experiment, can be considered to be the result of an increase in the physiological function of lysosomes, connected with the processes of autophagocytosis and directed at the restoration of membranes and macromolecules, damaged by T-2 toxin (A. A. Pokrovskiy and V. A. Tutel'yan).

The basis for the mechanism of the sharp decrease in the blood serum alkaline phosphatase, in response to T-2 toxin administration, demonstrated by us and by other researchers (Pearson; Weaver et al.), apparently is a distinctive sensitivity to T-2 toxin by the cells, characterized by rapid regeneration. The epithelial cells of the small intestine belong to this group and they are one of the major sources of serum alkaline phosphatase (Pearson; Sato et al.).

Thus, as a result of these experiments, it has been possible to demonstrate a high sensitivity and selectivity of the enzyme tests chosen to evaluate the toxicity of low doses of T-2 toxin in a subacute experiment. There is every reason to believe that the enzymatic approach, together with other methods, can be utilized for experimentally valid regulation of T-2 toxin content (levels) in foodstuffs and feeds.

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PHARMACOLOGIC ENHANCEMENT OF WORK CAPACITY IN MODEL STUDIES

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian No 2, Mar-Apr 84 pp 5-15

SHASHKOV, V. S. and LAKOTA, N. G., Institute of Biomedical Problems, USSR Ministry of Health, Moscow

[Abstract] An editorial is presented on pharmacologic enhancement of work capacity based on review of experimental studies on rats and on humans, on 63 male subjects, 23 to 40 years old. The analysis of the efficacy of the various preparations and of the physiologic criteria for their assessment is based on the theoretical assumption that work performance/capacity consists of three fundamental components, i.e., energy formation, neuromuscular function and psychological factors. Such studies are particularly relevant to situations where physiological systems are adversely affected by environmental factors as occurs, for example, in space flight, job stress, etc. Fatigue-inducing tests have demonstrated that a combination of drugs or other pharmacologically active preparations have to be employed to maintain the various physiological systems at acceptable levels of function, and that cardiovascular parameters provide a reliable indication of the overall performance. Under a variety of conditions, pretreatment with anabolic agents, metabolites and amino acids has been shown to be effective in improving energy reserves and metabolic efficiency, and to potentiate the effects of subsequently administered low doses of CNS stimulants. Figures 4; references 21: 12 Russian, 9 Western [549-12172]

UDC 615.2/.3/033:[612.124:547.962.3

SERUM ALBUMIN: TRANSPORT RECEPTOR SYSTEM FOR PHYSIOLOGICALLY ACTIVE SUBSTANCES

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian No 2, Mar-Apr 84 pp 93-100

SHIMANOVSKIY, N. L., Chair of Molecular Pharmacology and Radiobiology, Second Moscow Medical Institute imeni N. I. Pirogov

[Abstract] This is a review of the more recent knowledge regarding the transport function of serum albumin, particularly of the changing view that such transport has metabolic significance and is much more than simple non-specific binding. The topics covered include the transport of hormones, drugs, bilirubin, calcium and copper ions, and pyridoxal phosphate. The receptor sites on the serum albumin molecule and their affinities for the different ligands are considered in relation to albumin structure and metabolism. Of particular recent interest is the possible formation of covalent bonds between albumin and various ligands, such as appears to be the case with pyridoxal phosphate, vasopressin, D-glucose, penicillin, fluorescein, thromboxane A<sub>2</sub> and prostaglandin H<sub>2</sub>. Although serum albumin



has been shown to bind certain ligands in a specific manner, the exact physiological significance of such binding remains to be elucidated since more than simple transport function may possibly be involved. References 61: 7 Russian, 54 Western [549-12172]

UDC 616.284.038.076.9

STUDY OF PHARMOKINETICS OF NEW ANTIMALARIAL PREPARATION DABEQUIN ON MONKEYS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 4, Jul-Aug 8 (manuscript received 22 Dec 82) pp 23-29

LUR'YE, A. A., DINH THI THANH and LE DUC DAO, Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow; Institute of Malariology, Parasitology and Entomology, Ministry of Health, Socialist Republic of Vietnam, Hanoi

[Abstract] The new antimalarial preparation 4[2'diethylaminoethyl)amino] benzo[g]-quinoline, or dabequin, functions much like 4-aminoquinoline and may be effective in combating chloroquin-resistant strains of malaria. The present article reports on research on Vietnam with five rhesus monkeys. Blood tests were made 0.5, 1, 2, 3, 4 and 5 hours after administering doses of 1.76 mg/kg body weight. Regressive analysis by a least-squares method and statistical processing of pharmacokinetic data resulted in rather high correlation of data for total values and for the  $\alpha$ -phase, but  $\beta$ -phase values were much less ( $\sim 0.68$  with a range of 0.56-0.76, compared to ranges of 0.85 to 0.98/9). Dabequin was absorbed quickly after oral administration. Lack of previous, similar analyses hampered the study, since no comparable data for the pharmacokinetics of chloroquin or other related preparations were available. Parallel studies must be conducted to support this study, but the results obtained indicate that there is no significant difference in absorption rate or elimination, but dabequin is distributed to organs and tissues much more slowly than the latter medication. Thus its effectiveness is longer and side effects are less likely. Figures 4; references 15: 6 Russian, 9 Western [557-12131]

UDC 613.2-099(479.22 "1979-1982")

ANALYSIS OF AFLATOXIN CONTAMINATION OF FOODSTUFFS IN VARIOUS PARTS OF GEORGIAN SSR 1979-1982

Moscow VOPROSY PITANIYA in Russian No 6, Nov-Dec 83 (manuscript received 9 Mar 83) pp 67-69

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[Abstract] Findings are presented from a study of aflatoxins in corn, wheat, oats, barley, peas, beans, rye, soy and concentrated animals fodders during the period 1979-1982 in the Georgian SSR to check for compliance with minimum-level regulations and clarify variability in mycotoxin contamination. Samples for analysis were collected from 47 regions taking climatic and geographical factors into account. Toxin contents were determined by thin-layer chromatography. With an overall contamination level of 2 percent in harvests gathered in 1979-1981 and 1.3 percent for 1981-1982, the highest aflatoxin concentrations were found in corn (up to 600 micrograms per kilogram), tending to confirm the author's opinion that corn and peanuts form a favorable substrate for aflatoxins under natural conditions. Full details of results are presented in tabular form. The findings indicate that mycotoxins can occur not only in tropical but also temperate climatic conditions, confirming earlier studies. Humidity and temperature appear to be the main factors in the formation of aflatoxins: maximum detection of aflatoxins was in regions distinguished by their high humidity and temperature. Despite the relatively low frequency with which aflatoxins were detected and the low mean contamination of 7.5 micrograms per kilograms, samples were found in which concentrations exceeded the maximum permissible level. It is concluded that better monitoring of aflatoxin contamination should be instituted in the Georgian SSR. Figures 1; references 9: 6 Russian, 3 Western [572-9642]

UDC 612.017.4:612.33.015.15

EFFECTS OF SHIGELLA ENTEROTOXIN ON INTESTINAL ENZYMES

Tashkent UZBEKSKIY BIOLOGICHESKIY ZHURNAL in Russian No 1, Jan 84 (manuscript received 18 Apr 83) pp 9-11

BABADZHANOVA, B. N. and BABAYEV, T. A., Uzbek Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases, Uzbek SSR Ministry of Health

[Abstract] Shigella flexneri 2a enterotoxin was administered intraperitoneally to albino rats to determine the effects on maltase, invertase and

$\gamma$ -amylase activities along the length of the small intestine. The animals were followed for 72 h after the administration of the toxin (0.53 mg protein per 100 g weight), and evaluations of the intestinal homogenates for the 3-day period demonstrated variable alterations in enzymatic activities. However, in the proximal, intermediate and distal segments of the small intestine an overall pattern of depressed activity was evident throughout the entire period of observation. Singular exceptions were the rise in maltase activity by 12.7 percent in the proximal segment within 24 h of toxin injection, and an elevation of  $\gamma$ -amylase activity in the entire segment at 72 h. Figures 1; references 5: 3 Russian, 2 Western  
[546-12172]

UDC 612.33.015.36:577.175.859/.014.46:615.919:579.843.1

#### EFFECTS OF CHOLERA ENTEROTOXIN ON PROSTAGLANDIN BIOSYNTHESIS AND METABOLISM IN SMALL INTESTINE

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 8, Aug 83 (manuscript received 4 Mar 83) pp 37-39

ZOLOTUKHIN, S. V., PAVEL'SKIY, K. E., POMOYNETSKIY, V. D., KLADUKHINA, L. S. and YURKIV, V. A., Central Scientific Research Institute of Epidemiology, USSR Ministry of Health, Moscow

[Abstract] Isolated intestinal loop studies were conducted on outbred rats to determine the effects of cholera enterotoxin (CE) on prostaglandin biosynthesis and metabolism. Intraluminal introduction of CE (150  $\mu$ g per 180-200 g rat) led to a 2.5-fold increase in the prostaglandin level of the small intestine within 30 min, with a decrease in 1 h and return to background levels in 2 h. Sham-operated rats showed an increased prostaglandin synthase activity after 1 h, presumably due to increased blood levels of agents favoring prostaglandin biosynthesis. Intraluminal introduction of indomethacin (20 mg/kg) inhibits prostaglandin synthesis within 30 min by 80 percent; administration of CE 1 h after pretreatment with indomethacin resulted in a gradual increase in the tissue levels of prostaglandins, reaching a maximum 1 h after CE administration. In addition, administration of CE was found to induce the synthesis primarily of the diarrhoeogenic prostaglandins PGE and PGF (and their metabolites,  $\text{PGA}_2$ ,  $\text{PGB}_2$ , 15-keto-PGF $_{2\alpha}$ ). These observations demonstrate that CE can alter the prostaglandin balance within the intestinal cells, and thereby contribute to the development of diarrhea. Figures 3; references 8 (Western)  
[568-12172]

MECHANISM OF INHIBITORY EFFECTS OF ANTIDEPRESSANTS AND PSYCHOSTIMULANTS ON SYNAPTOSOMAL MONOAMINE UPTAKE

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 8, Aug 83 (manuscript received 3 Mar 83) pp 52-54

GANKINA, Ye. M. and MAYSOV, N. E., Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow

[Abstract] Synaptosomal fractions of the rat cerebral cortex were employed in studies on synaptosomal uptake of monoamines and the effects exerted by antidepressants and stimulants. Imipramine showed noncompetitive inhibition with respect to norepinephrine, dopamine and, especially, serotonin. Viloxazine and zimelidine showed a similar pattern of effects; again, maximum inhibition was obtained with serotonin. Evaluation of the kinetic constants indicated that the active site of serotonin carrier has greater similarity with the dopamine carrier site than with the site for norepinephrine, and that the dopamine site is conformationally more labile than the sites for the other monoamines. However, the dopamine site also possesses certain structural limitations in comparison with the other sites since it is less accessible to viloxazine. These observations support the contention that the various monoamine transport systems in the brain are closely interrelated, and that each transport system is capable of transporting the other two monoamines. Figures 1; references 11: 5 Russian, 6 Western [568-12172]

EFFECTS OF SEROTONINERGICS ON AVOIDANCE BEHAVIOR IN ACUTE STRESS

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 8, Aug 83 (manuscript received 4 Mar 83) pp 59-62

SHELEKHOV, S. L. and VAL'DMAN, A. V., Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow

[Abstract] Wistar rats were employed in studies on the effects of serotonin agonists and antagonists on the avoidance behavior of animals in a panic situation. Reduction in the latent time for the avoidance reaction and a decrease in unsuccessful avoidance attempts was obtained with agents exerting serotonergic effects (5-hydroxy-tryptophan 10 mg/kg, i.p.; zimelidine 2.5 mg/kg, i.p.; pyrenepyrone 0.02 mg/kg, i.p.; ciproheptadine 0.5 mg/kg, i.p.). However, agents that mimic the effects of dopamine or norepinephrine (trazodone, m-chlorophenylpiperazine, and high doses of zimelidine and quipazine) exacerbated the negative effects of stress on avoidance behavior. Nevertheless, optimization of the avoidance behavior was obtained by a combination of pyrenepyrone or ciproheptadine (which

block the  $S_2$ -autoreceptors) with dopamine blockers. References 21:  
2 Russian, 19 Western.  
[568-12172]

#### PROPERTIES OF CHANNELS FORMED BY VENOM OF LITYPHANTES PAYKULLIANUS SPIDER

Moscow BIOFIZIKA in Russian Vol 28, No 6, Nov-Dec 83 (manuscript received  
6 Aug 82) pp 1002-1005

USMANOV, P. B., KAZAKOV, I. and TASHMUKHAMEDOV, B. A., Institute of Bio-  
chemistry, UzSSR Academy of Sciences, Tashkent

[Abstract] The authors had previously determined that the venom of lityphan-  
tes paykullianus, like that of the black widow spider, works by increasing  
the permeability of new cell membranes to ions. The present article reports  
on that venom's effect on bilayer phospholipid membranes obtained from bull  
brains and attached to a teflon cell. Electrical parameters were measured  
by a fixation procedure with an electrometric accelerator with input resis-  
tance of  $10_{10}$  ohms. Results showed that the permeability of the membrane  
increased by 2-4 times in linear dependence on the type of electrolyte  
used. Permeability plateaus reflect consecutive stages of inclusion of  
separate channel elements, at five different levels of venom effectiveness.  
Differences in channel formation were noted for LiCl, NaCl, KCl,  $CaCl_2$  and  
 $MgCl_2$  electrolytes, but the reasons for this difference are as yet unclear.  
Selectivity of pH 7.5 is cationic, with a weak discriminatory tendency  
toward ions of similar dimensions. Temporal parameters appear to be  
related to polarity, with stable channels forming when venom is introduced  
at the positive potential, and a tendency to seek a closed state when venom  
is introduced at the negative potential. The L. paykullianus venom was like  
toxins of snakes and Arthropoda. Figures 4; references 4 (Western)  
[578-12131]

UDC 547.967.4:612.81

#### LEARNING AND MEMORY NEUROPEPTIDES

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 1, Jan 84 (manu-  
script received 10 Oct 83) pp 70-84

PAPSUYEVICH, O. S. and CHIPENS, G. I., Order of Labor Red Banner Institute  
of Organic Synthesis, Latvian SSR Academy of Sciences

[Abstract] Hormones of the hypophysis have long been known to accelerate  
the formation of conditioned reflexes and facilitate their retention in  
animals. The neurotropic and psychotropic activity of vasopressin-like  
substances is discussed here. The interrelationship between structure and  
function of neurohypophysis hormones including vasopressin and oxytocin is

analyzed. The practical application of such hormones in treatment of mental disease has been intensively studied for the past 5 or 6 years. Vasopressins are very effective agents for treatment of memory disorders including those associated with cerebral atherosclerosis, epilepsy, head injuries and chronic alcoholism. Vasopressin analogs which do not have hormonal effects but do act on the central nervous system are of particular interest for practical application. Some, such as the desglycin analogs, are already in use in the treatment of memory disorders. Vasopressins are also useful in the treatment of certain forms of schizophrenia. The very high biologic activity, specificity and selectivity of action, low toxicity and high therapeutic effects of learning and memory neuropeptides indicate the great promise of these substances in the treatment of mental disorders. References 99:

24 Russian, 75 Western

[573-6508]

UDC 616.15-099:579.852.13]-078.734

#### COMPARATIVE EVALUATION OF METHODS OF ASSAYING PERFRINGENS TYPE A ANTITOXIN LEVEL

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 11, Nov 83 (manuscript received 21 Jan 83) pp 82-84

SHEMANOVA, G. F., TRAPEZOV, Ye. V., MUSINA, Ye. Ye., VLASOVA, Ye. V., PANTELEYEV, E. I., BABAYTSEVA, V. A. and BOCHANOVA, N. G., State Scientific Research Institute of Standardization and Testing of Medical Biological Preparations imeni L. A. Tarasevich, USSR Ministry of Health; Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] A comparative determination is presented of the level of perfringens type A antitoxin in human blood serum by the toxin neutralization reaction, passive hemagglutination reaction and the enzyme-labeled antibody reaction. Blood sera were obtained from persons immunized with C1. perfringens type A toxin. Comparative determinations of perfringens antitoxin level were performed in 96 human blood serum samples. The correlation coefficient of results obtained by determination of antitoxin in the toxin neutralization reaction in vivo and in vitro was 0.88 percent. The correlation coefficient of data from the same sera obtained using the hemagglutination reaction as related to the toxin neutralization reaction in vitro was 0.64. The correlation coefficient for the enzyme-labeled antibody reaction was 0.39. The enzyme-labeled antibody reaction is quite specific provided sensitized polystyrene plates are used and highly purified anatoxin is used to prepare the erythrocyte diagnosticum. Figure 1; references 5: 3

Russian, 2 Western

[524-6508]

UDC: 615.214.31.015.4:612.821.1/.3

EFFECT OF PSYCHOSTIMULATORS IN LEARNING AS A FUNCTION OF EXTERNAL AND INTERNAL FACTORS

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 1, Jan 84 (manuscript received 5 Mar 83) pp 53-55

BELOZERTSEV, Yu. A., Chita Medical Institute

[Abstract] A study is made of the significance of external (type and complexity of behavior assignment) and internal (level of research activity and emotional reaction) factors in animals exposed to psychostimulants in learning experiments. White rats were trained in a T-shaped labyrinth with electrical stimulation of the feet and in a Dombrovskaya labyrinth with four doors in each of four barriers. Sindocarb, phenamine, caffeine, acepagne, pyracetam and euclidan were administered interperitoneally 20 minutes before each training session. The results indicated that the factor of difficulty of the problem was directly reflected in the capability of the main psychostimulants to increase learning. The type of problem was of less significance. The pharmaceutical facilitation of the stage of evaluating the situation information and construction of motor programs depends to a greater extent on the emotional factor than on research activity. References 10: 7 Russian, 3 Western [523-6508]

UDC: 616.127-008.3-02:[616.919:579.861.2+615.373:547.962.4]-092.9

INFLUENCE OF STAPHYLOCOCCUS TOXIN AND ITS COMPLEX WITH ANTISTAPHYLOCOCCUS GAMMA GLOBULIN ON ELECTRIC AND CONTRACTILE ACTIVITY OF GUINEA PIG MYOCARDIUM

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 10, Oct 83 (manuscript received 25 Mar 83) pp 16-19

VORNOVITSKIY, Ye. G., IGNAT'YEVA, V. B., PASHUTIN, S. B. and BELOTSKIY, S. M., Institute of Surgery imeni A. V. Vishnevskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] A study was made to determine the nature of the direct influence of staphylococcus toxin on the myocardium and to compare its effect with that of antitoxin and the capability of antistaphylococcus gamma globulin to prevent the cardio-depressive effect of the toxin. Experiments were performed on 21 guinea pig hearts in saline solution. Many of the preparations showed spontaneous contractile activity and no electrostimulation was used in these cases. After the amplitude of contractions became stable for 15 or 20 minutes, the concentration of toxin or antitoxin was gradually increased in the solution and the dose-effect curve determined. When the toxin and antistaphylococcus gamma globulin were used simultaneously, the toxin concentration which had caused 10 to 20 percent decrease in contractile

amplitude was used and gamma globulin was used in equivalent concentration, 3 times lower concentration and 3 times higher concentration. It was demonstrated that the toxin not only has a cardio-depressive effect, but also can, at low concentration in the solution, cause a positive inotropic effect. The gamma globulin had no protective properties, indicating that administration of antistaphylococcus gamma globulin to patients in septic shock may increase damage to the heart. Figures 3; references 15: 2 Russian, 13 Western  
[529-6508]

UDC: 615.217.32.015.23:615.355:577.311.042.5

#### TESTING OF CHOLINESTERASE REACTIVATORS AS PROSERINE ANTAGONISTS

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 10, Oct 83 (manuscript received 11 Mar 83) pp 66-68

PROZOROVSKIY, V. B., KHRAMOVA, E. A. and ARDAB'YEVA, T. V.

[Abstract] An attempt was made to select a reactivator which in combination with cholinolytics can achieve a high protective effect in proserine poisoning. Lethal, toxic and effective doses of preparations were determined in experiments with 250 male white mice. Cholinolytics were administered subcutaneously 15 minutes before subcutaneous injection of proserine, cholinesterase reactivators were administered intraperitoneally one minute before proserine. Experiments in vitro were used to estimate the reactivating effect of HI-6 and TMB-4. The use of HI-6 significantly increased the effectiveness of prevention of side effects arising upon administration of large doses of proserine. The mechanism of action of HI-6 is noncompetitive reduction of cholinoreceptor activity. Figure 1; references 14: 4 Russian, 10 Western  
[529-6508]

UDC: 576.8.097.29:611.36:616.078.4

#### ULTRASTRUCTURAL PRINCIPLES OF ENDOTOXIN ACTION ON ENDOTHELIAL CELLS

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 2, Feb 84 (manuscript received 24 May 83) pp 185-188

BARDAKHCH'YAN, E. A. and PAL'CHIKOVA, Ye. I., Rostov Medical Institute

[Abstract] Endotoxin shock was produced in 10 anesthetized dogs by intravenous administration of 5 mg/kg bacterial solutions. Blood pressure was recorded with an ultrasonic sensor. Five hours after injection, circulating endothelial cells in the blood were counted. Liver fragments were fixed in 3 percent gluteraldehyde and examined under an electron microscope. The



The data obtained indicate that the destructive damage to the blood vessels is probably a result of interaction of the endothelium and formed elements of the blood. It is also obvious that all alteration is potentiated by hemodynamic stress and other preceding damage caused by the stress.

Figures 2; references 13: 9 Russian, 4 Western  
[522-6508]

UDC 612.289:577.352.5

EFFECT OF CALMODULIN-BLOCKING AGENTS ON PROCESS OF INHIBITION OF POTENTIAL-DEPENDENT NERVE CELL MEMBRANE CALCIUM CONDUCTION BY INTRACELLULAR  $\text{Ca}^{2+}$  IONS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 2, Jan 84 (manuscript received 10 Jun 83) pp 471-472

DOROSHENKO, P. A. and MARTYNYUK, A. Ye., Institute of Physiology imeni A. A. Bogomol'tsa, UkSSR Academy of Sciences, Kiev (presented by academician P. G. Kostyuk, 26 May 83)

[Abstract] Data confirming participation of calmodulin in regulation of potential-dependent calcium-conductivity of nerve cell membranes by intracellular  $\text{Ca}^{2+}$  ions are presented and discussed. Effect of calmodulin blockers (trifluoperazine and substance R24571) on the rate of decrease of maximum calcium current upon intracellular perfusion of nerve cells by triaspartate solution was studied. Quantitatively similar results from both blockers indicate considerable slowing of the rate of decrease of calcium current amplitude after intracellular perfusion of the nerve cells. This effect is reversible. Results obtained confirm participation of calmodulin in blocking potential-dependent calcium-conductivity of the cell by an increase of intracellular level of  $\text{Ca}^{2+}$  ions. Qualitative similarity of effects of calmodulin blockers and phosphodiesterase on the course of changes of calcium conductivity of the neuronal membrane, during intracellular perfusion of cells by  $\text{Ca}^{2+}$ -containing solutions, confirm the mediation by calmodulin of  $\text{Ca}^{2+}$ -dependent activation of phosphodiesterase in mollusc nerve cells and also the essential role of  $\text{Ca}^{2+}$  calmodulin activated cisAMP-phosphodiesterase in regulation of calcium conductivity by intracellular  $\text{Ca}^{2+}$  ions. Figure 1; references 6: 2 Russian, 4 Western [544-2791]

SECOND ORDER INACTIVATION KINETICS OF SODIUM CONDUCTANCE: THERMODYNAMIC AND PHYSIOLOGICAL TESTS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 6, Feb 84 (manuscript received 24 Mar 83) pp 1511-1514

GNETOV, A. V. and KRYLOV, B. V., Leningrad State University imeni A. A. Zhdanov; Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad

[Abstract] Thermodynamic and voltage clamp tests were conducted on sodium permeability changes in the node of Ranvier in motor fibers. These studies demonstrated that the exponential dependence of the second order inactivation system on the potential corresponds to a lack of dependence of the effective charge on the action potential. Therefore, the mechanism of sodium adaptation is based on prolonged repolarization of the initial action potential, and on either constant or diminished subsequent potentials due to additionally inactivated sodium channels. Figures 3; references 11 (Western)  
[548-12172]

UDC: 612.014.461.2+621.27.+616.001.11

ESTIMATE OF SAFETY OF DECOMPRESSION BASED ON NUMBER AND SIZE OF GAS BUBBLES FORMED IN BODY

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIA BIOLOGICHESKAYA in Russian No 6, Nov-Dec 83 (manuscript received 7 May 82) pp 822-834

NIKOLAYEV, V. P., Institute of Medical-Biological Problems, USSR Ministry of Health, Moscow

[Abstract] The purpose of this work is critical analysis of the traditional criterion of decompression safety suggested by Boycott, Haldene and Priestly based on estimation of saturation of the body with gases, by mathematical models of saturation and desaturation of the blood and tissues. An alternate criterion is suggested based on direct estimation of the number and size of gas bubbles formed in the body and the possibility of its practical utilization is demonstrated on the example of analysis of the safety of pressure drops in a hyperbaric medium with normal oxygen content. Figures 2; references 34: 15 Russian, 19 Western  
[564-6508]

UDC 616.98-036.88-053.2-07

SIGNIFICANCE OF MAJOR INFECTIOUS DISEASES IN PEDIATRIC MORTALITY

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 8, Aug 83  
(manuscript received 20 Jul 82) pp 40-41

ARTEMOV, V. G., ZAMOTIN, B. A., AVERINA, G. A., SEMINA, V. N. and  
TRET'YAKOVA, V. N., Chairs of Epidemiology, Social Hygiene and Public Health  
Administration, Ryazan Medical Institute imeni Academician I. P. Pavlov;  
City Department of Health, City Sanitary-Epidemiologic Station, Ryazan

[Abstract] An analysis was made of 713 cases of pediatric mortality in Ryazan in the period 1973-1981 up to the age of 15 years, without detailed analysis of cases occurring within the first month of life. On an age basis, 72.3 percent of the mortality was recorded for cases 1 month to 1 year old (50.9 percent of the total number occurring within the first month of life), 19.7 percent for the 1 to 3 year old bracket, 6.6 percent for the 3-7 year group, and 1.4 percent for the 7-15 year group. Respiratory diseases accounted for 62.4 percent of the total mortality, meningococcal infections for 16.4 percent, intestinal infections for 14.6 percent, and viral hepatitis for 5.2 percent. In the last 3 years, however, pediatric mortality due to respiratory infections decreased to 58.3 percent of the total cases, and that due to intestinal infections fell to 8.9 percent.  
[567-12172]

INFANT MORTALITY: STATUS, TRENDS AND PROSPECTS

Moscow NASHE ZDOROV'YE in Russian 1983 pp 17-27

IGNAT'YEVA, R.

[Abstract] This discussion of some aspects of infant mortality in the past, present problems existing in this area and prospects for reducing infant mortality in the future includes: causes of death in the first year of life, reduction of infant mortality in developed countries after World War II, differences in infant mortality in various countries, review of child mortality from the pre-revolutionary period to the present in the USSR,

differences in infant mortality in urban and rural areas of the USSR, causes of infant mortality, mortality rates in girls and boys, relationship of infant mortality to social conditions, influence of biosocial factors on health of mother and child, role of the family situation in the health of mother and child, harmful effect of smoking and abuse of alcohol and relationship of the health of parents to the health of children. Measures aimed at reducing infant mortality are discussed.  
[543-2791]

#### INDUCED ABORTIONS AND CONTRACEPTION AS MAJOR PROBLEMS IN PRESENT DAY PUBLIC HEALTH CARE

Moscow NASHE ZDOROV'YE in Russian 1983 pp 28-37

KATKOVA, I. and MANUILOVA, I.

[Abstract] Medical, social, economic and psychological aspects of practice of induced abortions and contraception in the USSR are discussed. Topics discussed include statistical data on induced abortion for some areas of the USSR; relationship of social-economic level, level of education and age at marriage to abortion rates and medical and social-economic problems related to induced abortions. Importance of problems related to use of induced abortions, contraception and family planning in Soviet republics in which large families are the rule is assessed; some demographic statistics for the UzSSR are presented. Contraception as an alternative to induced abortions is discussed with emphasis on psychological and social-economic aspects of the use of contraceptives. Contraceptive methods are discussed. The need to develop more effective measures for dealing with problems related to the use of birth control and family planning is stressed.  
[543-2791]

#### SOCIAL AND DEMOGRAPHIC ASPECTS OF LARGE FAMILIES OF MOSCOW

Moscow NASHE ZDOROV'YE in Russian 1983 pp 72-83

GRININA, O. and CHEREPANOVA, I.

[Abstract] Demographic data concerning large families in Moscow are presented and discussed and results of analysis of the reproductive function of the family are presented. Families in which it was the first marriage for each partner are discussed. Data concerning 514 families responding to a survey of social and hygienic characteristics of large families in Moscow were analyzed and discussed. Psychological aspects of the life of large families studied were described. Use of the information obtained in public health work and in formulating overall demographic policy was recommended.  
[543-2791]

MEDICAL AND DEMOGRAPHIC CHARACTERISTICS OF STATE OF HEALTH OF PEOPLE OF WESTERN URALS

Moscow NASHE ZDOROV'YE in Russian 1983 pp 84-91

PODLUZHNYAYA, M. and POLUZHNYI, P.

[Abstract] Findings from a complex social-hygienic study of the state of health of people of the Western Urals, conducted by personnel of Perm State Medical Institute from 1970-1978, are discussed. Data concerning the effect of the state of health of parents (especially the wife) on planned and actual family size are presented and discussed. Social-hygienic and biometrical data concerning infant mortality in this area are presented and causes of death in children, adults and industrial workers are discussed. Life expectancy figures were also presented and discussed and the close interaction of reproductive processes and the state of health of the people, volume and quality of medical aid and social and hygienic factors are discussed. The use of these findings in developing public health measures is recommended.

[543-2791]

DEMOGRAPHIC PROCESSES AND FEATURES OF MORBIDITY IN PEOPLES IN NORTH

Moscow NASHE ZDOROV'YE in Russian 1983 pp 92-102

YG'YA, N. and GERMAN, G.

[Abstract] Problems related to population dynamics, health and fitness to work with regard to advancing rates of development in the northern regions with their special climatic and geographical, industrial and social conditions combined with high population mobility and poor accessibility to the region are discussed. Demographic data for regions of the north are presented. The trend toward urbanization is discussed. The importance of migration is emphasized. Age structures of indigenous populations are discussed. Population dynamics for this area in the postwar years are compared with those for other areas of the Soviet Union. Changes in mortality statistics for the region are described with special reference to increases in rates of "diseases of civilization" (cardiovascular disease, stress related disease, etc.) The role of climatic conditions in delaying industrial production is described. Deeper understanding of the interaction of man and the environment is required in order to cope with these and future problems in this region.

[543-2791]

## PROBLEMS OF MODELLING PROCESSES OF REPRODUCTION OF HEALTH OF THE PEOPLE

Moscow NASHE ZDOROV'YE in Russian 1983 (signed to press 25 Aug 83) pp 103-116

YERMAKOV, S. and KOMAROV, Yu.

[Abstract] Methodological problems faced in formulating a new scientific trend, which the authors refer to as modelling processes of reproduction of the health of the people are discussed. The trend involves the attempt to determine quantitatively the role and place of health in modern society and to take more effective measures to improve the health of Soviet peoples. Basic assumptions used in compiling a health index are presented and discussed. Certain trends of the modelling are listed and discussed in some detail. They are: the effect of health of the people on effectiveness of public production; effect of health of the people on reproduction and labor reserves indicators; interaction of living conditions, life style and standard of living on health; effect of various social-economic subsystems of society in forming the level and structure of health; factors and results of migration on health; organization of profound social-hygienic and epidemiological studies and their results in modelling reproduction of health of the people and models of processes of reproduction of health and regional scientific and practical health protection programs.  
[543-2791]

UDC 616-084.3-036.8

## IMPROVING EFFICACY OF OUTPATIENT CARE

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 12, Dec 83  
(manuscript received 15 Feb 83) pp 6-8

SAVINA, Te. M., Chair of Social Hygiene and Organization of Public Health,  
Rostov Medical Institute

[Abstract] In line with official policy, greater emphasis in Soviet medical practice is now being laid on the concept of "dispensarization," i.e., outpatient work with patients so as to assure early detection and improve prevention of disease. This is being done without increasing the numbers of physicians involved in this work, and accordingly establishing criteria to assess the efficacy of this work has become an important question. A study was made of one aspect of the activity of physicians and patients and their role in improving the efficacy of outpatient health care, namely that activity shown by physicians and patients in eliminating, in the latter, harmful habits that adversely affect outpatient care. Two groups of patients (125 failing to observe established regimens and 136 observing them) completed questionnaires on smoking habits and alcohol consumption and their physicians' actions in helping them to break these habits. All patients were able-bodied men with gastric and duodenal ulcers; all worked in industrial enterprises. Patients in the latter group experienced fewer exacerbations

of disease; all patients failed to express any positive opinion on their physicians' specific work to help them break habits of smoking and alcohol consumption. The apparent reason for the low level of physician work in this area is patient overload (2,500 per physician). It was found that 80-85 percent of examining physicians fail to adequately reveal the factors leading to disease and therefore take no steps to eliminate them; and the therapy that is initiated is thus frequently less effective. The problem of patient cooperation in therapy is discussed. Data are cited from a study of oncological patients showing definite patterns in patient attitudes toward medication. It is shown that even patients for whom smoking and alcohol consumption can be life-threatening still sometimes refuse to comply with medical advice. No references.

[566-9642]

UDC 614.881-07

#### INDEXES DETERMINING ACTIVITY OF EMERGENCY HOSPITALS

Moscow ZDRAVOOKRANENIYE ROSSIYSKOY FEDERATSII in Russian No 12, Dec 83  
(manuscript received 19 Nov 82) pp 8-10

KUSTAKOVA, Ye. A., ZAYTSEV, V. G. and DMITRIYEVA, N. M. Moscow Scientific Research Institute of First Aid imeni N. V. Sklifosovskiy

[Abstract] Initial attempts are reported in establishing criteria for evaluating the activity of hospitals in the emergency [skoraya pomoshka] service]. As a first step an analysis was made of the activity of eight emergency hospitals in the Moscow area, using hospital records covering the period 1979-1981. Details are given of emergency cases handled in the 8 hospitals' 8,800 beds involving a total of 186,800 patients. Indexes for emergency cases (bed usage, average length of stay, diagnostic differences, surgery, mortality rates during and after surgery, complications) are shown for the main emergency categories in tabular form. Details of radiography for patients are discussed. Figures are shown for blood and biochemical analyses and other laboratory investigations. The greatest work load was placed on the surgical and cardiological departments. Analysis showed that during the period studied, improvements were noted in many of the indexes. In particular, postsurgical deaths were reduced 1.4-2.0 percent, and diagnostic differences, 5.1-8.2 percent. Treatments periods were reduced 4.3 days in the therapy departments. Emergency hospitals still have considerable reserves for improving the efficiency of bed usage by setting up central consultative/diagnostic centers operating round the clock. Treatment can also be improved by having resuscitation equipment available in small out-of-town hospitals. No references.

[566-9642]



## PREVENTIVE MEDICINE AND MASS SCREENING

Moscow ZADROOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 1, Jan 84  
(manuscript received 13 Oct 83) pp 3-7

DEMCHENKOVA, G. Z., All-Union Scientific Research Institute of Social Hygiene and Organization of Public Health imeni N. A. Semashko, USSR Ministry of Health, Moscow

[Abstract] A summary is presented on the current plans in the USSR for medical mass screening (dispensarization) of the entire Soviet population as a first step in the implementation of a nationwide preventive medicine program. The program envisages the development of an extensive network of clinics and other health facilities and services, particularly in the rural areas, and expansion and improvements in existing facilities. Within the existing Soviet health system, more than 70 percent of the population is subject to routine medical screening within occupational or education health maintenance systems. Less than 30 percent of the population will have to be actively enlisted in such a program, and only a small percentage (2 percent) will require home visits.

[565-12172]

UDC 616-084.3-038.8

## ADVANCES IN RURAL PUBLIC HEALTH AND EFFECTIVENESS OF AMBULATORY CARE

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 1, Jan 84  
(manuscript received 28 Mar 83) pp 7-9

KAMALOV, M. Kh., GOLUBEV, L. V., PETROV, M. Ye., VEKHNOVSKIY, O. L., AVZALOV, R. Sh., SAI TOV, M. I. and SAYFUTDINOV, V. A., Bashkir Republic Clinical Hospital imeni G. G. Kuvatov, Ufa

[Abstract] A review is presented of recent advances in health care delivery in Bashkiria, particularly in the rural areas. In addition to an increase in the number of hospital beds and available physicians, care was also taken to ensure closer cooperation between the rayon clinics and central hospitals, better telecommunication services and to enlist the support of party and government workers. Specific examples are taken from the Ilishevskiy and Tatyshlinskiy Rayons in illustrating the effects of rational organization of health clinics and mass screening in reducing the economic losses in rural areas due to illness.

[565-12172]

MANAGEMENT AND DEVELOPMENT OF MOSCOW EMERGENCY MEDICAL STATION

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 1, Jan 84  
(manuscript received 1 Apr 83) pp 9-13

KAVERIN, N. M. and EYDEL'MAN, G. P.

[Abstract] A brief background is provided for the Moscow Medical Emergency Station [Skoraya Pomoshch] and its present organization into a single service with several substations. The reorganization was completed in 1978; in the 8 years of the reorganization the number of substations increased from 22 to 37, and the number of annual ambulance calls increased 7.5-fold from a little under 300,000 in 1970 to over 2 million in 1979. The latter statistic also reflected the fact that in that period of time the population of Moscow grew by 14 percent. Because of organizational difficulties and undefined or poorly defined areas of responsibilities approximately 30 percent of such calls are inappropriate or unnecessary, a problem which is also compounded by inaccessibility of uchastok polyclinics, lack of telephones, misinformation, or refusal of local clinics to assign physicians for home visits between 1400 and 1800 hours. A more recent development has been the creation of specialized ambulance brigades or teams, such as cardiovascular, "unconsciousness," trauma, etc. Such practice is to be questioned, and it appears more reasonable to rely on ambulance teams capable of managing a variety of emergency situations.  
[565-12172]

UDC 616.2-036.11:313.13(47+57)-21)

ACUTE RESPIRATORY DISEASE STATISTICS IN LARGE CITY

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 1, Jan 84  
(manuscript received 23 Sep 82) pp 16-18

TYSHETSKIY, V. I., SOKOLOVA, N. S., KAZANSKAYA, V. V. and GORBENKO, P. P.,  
All-Union Scientific Research Institute of Pulmonology, USSR Ministry of Health; Chair of Social Hygiene and Organization of Public Health, First Leningrad Medical Institute

[Abstract] Studies were conducted on 631 pediatric subjects (up to 14 years old) and 1,235 adults (15 to 60+ years) in Leningrad on the cumulative incidence of acute respiratory infections (ARI) in relation to age and history of acute bronchitis, acute bronchitis + acute pneumonia, acute pneumonia or ARI only. Analysis of the statistical data demonstrated that individuals that had previously sustained any of the illnesses cited were at increased risk of ARI and the development of a chronic process. Evaluation of the ARI pattern can constitute an additional health status indicator of a population as a whole and of particular age groups. On the basis

of such data individuals at special risk of ARI can be identified, and timely steps can be taken to protect them when they are especially vulnerable.

[565-12172]

UDC 616-084:362.121]:008

#### BASIC TRENDS OF IMPROVEMENTS IN PREVENTIVE MEDICINE AT INDUSTRIAL ENTERPRISE HEALTH OFFICES

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 1, Jan 84  
(manuscript received 6 Dec 82) pp 18-21

ZHURAVLEVA, K. I. and ZAYTSEV, V. M., Chair of Social Hygiene and Organization of Public Health, Leningrad Sanitary-Hygienic Medical Institute

[Abstract] An analysis was made of the functional status of the health office (medsanchast) at the Kirov Machine Building Plant in Leningrad during the 1978-1980 period, in order to assess the contribution of such rooms to the wellbeing and job satisfaction of workers. A clear-cut positive correlation existed between the age of workers and number of visits per year. However, it was also evident that professional competence and educational activity of the physicians' assistants (feldshers) was a significant factor in the wellbeing of the workers and in promoting job satisfaction and reducing number of lost workdays. In addition to engaging in preventive and rehabilitative work, the physicians' assistants should also assume responsibilities in monitoring the health habits of workers and providing moral and psychological support as needed.

[565-12172]

UDC: 617.001:614.86]0-8-036.8

#### SPECIFICS OF PRESENT-DAY INJURIES IN TRAFFIC ACCIDENTS AND POSSIBILITY OF IMPROVING RESULTS OF MULTISTAGE TREATMENT OF VICTIMS

Moscow ORTOPEDIYA TRAVMATOLOGIYA I PROTEZIROVANIYE in Russian No 11, Nov 83  
(manuscript received 6 Apr 83) pp 1-5

ISTOMIN, G. P., Chair of Orthopedics, Traumatology and Military Field Surgery, Khar'kov Medical Institute

[Abstract] Increasing numbers of traffic accidents are now occurring farther from large cities; the number of accidents involving collisions between vehicles or with obstacles is increasing in comparison to the number of accidents involving one vehicle and one or more pedestrians. Prehospital medical treatment of traffic accident victims is performed in two or three stages, and the survival of the victim depends largely on the timeliness,

volume and quality of medical assistance in these stages. The author recommends that all professional drivers be trained in first aid as thoroughly as they are trained in traffic laws and rules of the road. Administrative measures are also suggested to improve quality and increase volume of the emergency medical treatment available to traffic accident victims.

References 14 (Russian).

[562-6508]

## PSYCHOLOGY

### SIXTH ALL-UNION CONGRESS OF USSR SOCIETY OF PSYCHOLOGISTS

Moscow VOPROSY PSIKHOLOGII in Russian No 1, Jan-Feb 84 pp 165-168

ROMANOVA, Ye. S., Moscow

[Abstract] This congress was held in August of 1983 and critically reviewed the most important achievements of psychological science in various areas: social and engineering, pediatric and pedagogic, general and differential psychology, psychophysiology, psychology of labor, management, etc. The congress discussed problems of the contemporary status of Soviet psychological science and the prospects of its future development. There were 2 plenary sessions, 48 symposiums and 3 round table discussions. The program was divided into 8 major areas: 1. categories, principles and methods of psychology; 2. the personality in the system of social relationships; 3. social-psychological problems under conditions of development of the socialist society; 4. psychological problems of increasing the effectiveness and quality of labor; 5. mental processes; 6. problems of psychophysiology; 7. education, indoctrination and mental development; and, 8. diagnosis of disorders and restoration of human mental functions. One of the round table sessions dealt with problems of the psychological service in the USSR. The other two provided opportunities for specialists and readers to meet with the editors of the journals "Problems of Psychology" and "Psychological Journal." Participants of the congress discussed shortcomings in the work of psychologists: the lack of combined studies, as well as of practical work on problems of field education. Resolutions of the congress concerned prospects for development of pediatric and pedagogic psychology. The importance and social significance of psychological aspects of professional orientation, labor and professional education were emphasized. [559-6508]

UDC 615.849.114.065.015.4].03:615.276.9

IMMUNOSTIMULATORY EFFECTS OF TUFTSIN IN IONIZING-RADIATION-EXPOSED MICE

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 5, May 83 (manuscript received 2 Jul 83) pp 34-35

VAL'DMAN, A. V., RATNIKOV, V. I., MAKAROVA, N. V. and KOZLOVSKAYA, M. M., Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow; Chair of Pharmacology, Chelyabinsk Medical Institute

[Abstract] Tuftsin was tested as an immunostimulant in ionizing radiation (450 sGy) immunosuppressed B mice by the determination of the number of antibody-forming splenocytes in mice pre- and post-treated with tuftsin. Administration of tuftsin (20 mg/kg, i.p.) for 5 pre-irradiation days had no immunostimulatory effect and the degree of immunosuppression was essentially identical to that seen in the experimental mice. However, post-treatment, beginning on the day of irradiation and continuing for a total of 5 days, resulted in the retention of an almost normal level of splenocytes forming antibodies against sheep erythrocytes (211 cells per  $10^6$  nucleated cells vs. 252 cells/ $10^6$  nucleated cells in control animals, and 32 and 36 cells/ $10^6$  nucleated cells in experimental and pre-treated animals, respectively). In tentative terms, the effects of tuftsin in the post-treatment protocol probably involved activation of antibody-forming precursor cells and of the macrophage system and, perhaps, activation of the limbic-hypothalamic complex. References 12: 5 Russian, 7 Western [570-12172]

CHARACTERIZATION OF BONE MARROW MONOLAYER CULTURES FROM RATS WITH PLUTONIUM<sup>239</sup>-INDUCED OSTEOSARCOMA

Leningrad VOPROSY ONKOLOGII in Russian No 3, Mar 84 (manuscript received 29 Jul 83) pp 49-54

BUKHTOYAROVA, Z. M. and LEMBERG, V. K.

[Abstract] Comparative studies were conducted on bone marrow monolayer cultures derived from Wister rats injected interperitoneally with Pu-239

(92.5 kBq/kg, leading to osteosarcomas in 58.4 percent of the animals) and from untreated control rats. Injection of the nuclide was followed by hypocellularity of the marrow cavity and some reduction in colony-forming capacity of the experimental rats, both tumor-bearing and tumor-free in comparison with the control rats. However, in the tumor-bearing animals proliferative activity was enhanced as indicated by an increase in the number of mitoses and multinuclear symplasts of the fibroblast-like cells. Cells from the latter animals also tended to form larger colonies, and monolayers of such fibroblast-like cells were marked by polyploidy (6-8 N vs. 4N for control cells). Diffusion chamber studies showed a higher incidence of osteogenic activity by cells derived from the tumor-bearing rats than exhibited by the tumor-free and control animals, both within the chamber and on the external surface of the filter. These observations may indicate new diagnostic factors to be assessed in determining radiation damage. Figures 3; references 10: 8 Russian, 2 Western  
[1034-12172]

UDC 616.155.1-02:616-001.28-092.9-085.371:579.841.94

BORDETELLA PERTUSSIS VACCINE-STIMULATED POSTRADIATION RECOVERY OF ERYTHROPOIESIS IN MICE

Moscow BYULLETIN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 8, Aug 83 (manuscript received 2 Nov 82) pp 94-97

KHOROBYKH, V. V., SANIN, A. V., BARTENEVA, N. S. and SNEGIREVA, A. Ye.,  
Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR  
Academy of Medical Sciences, Moscow

[Abstract] CBA, BABL/c and B6AF<sub>1</sub> mice were employed in studies on the effects of Bordetella pertussis vaccine on postradiation recovery of erythropoiesis, as indicated by <sup>59</sup>Fe incorporation into erythroid cells. The results showed that intravenous administration of the pertussis vaccine (10<sup>10</sup> cells) 24 h before irradiation enhanced erythropoiesis in both the bone marrow and, especially, the spleen of sublethally irradiated (6.0 Gy) mice. Additionally, it was observed that administration of the vaccine 4-5 days after irradiation enhanced endogenous colonization, presumably through activation of surviving erythroid stem cells. Support for the latter contentions, i.e., stimulation or activation of erythroid cells, comes from studies in which pretreatment of BABL/c mice with the vaccine accelerated the development of leukemia induced by injection of Rauscher's leukemia virus and led to 100 percent mortality by day 50 (vs. 100 percent mortality by day 156 in vaccine-untreated controls). The presumed mechanism involved a vaccine-induced increase in erythroid cells susceptible to the leukemia virus, although interferon inhibition by the pertussis vaccine cannot be excluded as a factor predisposing to a more virulent form of leukemia. Figures 3, references 13: 6 Russian, 7 Western  
[568-12172]

SEROEPIDEMIOLOGIC STUDY OF HUMAN AND CATTLE CHLAMYDIOSIS

Prague ZHURNAL GIGIYENY EPIDEMIOLOGII MIKROBIOLOGII I IMMUNOLOGII in Russian  
Vol 27, No 4, 1983 (manuscript received 9 Jun 82) pp 471-485

STEPANEK\*, O., JINDRICOVA\*\*, J., HORACEK\*\*, J. and KRPATA\*\*\*, V., \*Rayon  
Sanitary-Epidemiologic Station, Pardubice; \*\* Oblast Sanitary-Epidemiologic  
Station, Hradec Kralove; \*\*\* State Veterinary Institute, Pardubice, CSSR

[Abstract] Long-term serologic studies were conducted on the incidence of seropositive cattle and cattle-farm workers in the Pardubice area of Czechoslovakia. In the period 1967-1978 studies on 38,394 cattle sera revealed 16.1 percent positive samples, while the incidence of positive sera among cows with spontaneous abortions was 18.6 percent. In 1979 and 1980 the incidence of positive sera increased to 23.5 and 23.1, respectively, while the incidence of positive sera increased to 23.5 and 23.1 percent, respectively, while the incidence of positive sera for cows with spontaneous abortions was 34.4 percent. In addition, chlamydia were cultured in chick yolk sacs from tissue samples obtained from 452 aborted calves in the 1974-1978 period. Serologic monitoring of several hundred cattle-farm and cattle-yard workers involved with healthy and seropositive cattle showed that incidence of positive sera in the former group was 1.3 percent, and in the latter 7.5 percent. These data indicate that chlamydial infections constitute a real and ever-increasing threat to human and cattle health, and that control measures in the area will require close cooperation not only of district medical and veterinary physicians, but also of gynecologists, dermatologists and urologists. References 27: 1 Slovak, 18 Czech, 8 German  
[542-12172]



NATURE OF SPECIFIC ANTIBODIES IN ONCORNAVIRUS INFECTIONS

Moscow VETERINARIYA in Russian No 2, Feb 84 pp 32-34

SMIRNOV, P. N., KHRAMTSOV, V. V. and LEVASHEV, A. T., Institute of Experimental Veterinary Medicine of Siberia and the Far East

[Abstract] Studies were performed to determine the nature of the specific anti-oncornavirus antibodies in cattle with positive hematologic leucosis tests and positive diffusion precipitation reaction and in cattle with normal hemogram but positive diffusion precipitation reaction. The possibility was also studied of a sensitivity reaction to determine antibody-carrying animals. Studies were performed on cattle serum and plasma and diagnoses were confirmed by histologic studies. The results indicate that as the leucosis process develops in cattle in association with oncornavirus infection, specific antiviral antibodies consist primarily of class G immunoglobulins, which have been reported to have a blocking function. Immune lymphocytes probably react specifically first, largely determining the fate of tumors. Differentiation of anti-oncornavirus antibodies can be of great prognostic significance in cattle leucosis.  
[513-6508]

UDC: 619:615.371:576.858.6

STABILITY OF TURKEY HERPES VIRUS VACCINE STRAIN IN AEROSOL

Moscow VETERINARIYA in Russian No 2, Feb 84 pp 36-37

CHUBIS, A. I., SAFRONOV, S. V. and AMATOV, Kh. Kh., Kazakh Zonal Scientific Research Veterinary Laboratory for Poultry Diseases

[Abstract] A study was performed to determine the dynamics of the physical and biological inactivation of a vaccine strain of turkey herpes virus in an aerosol and to determine the physical-chemical parameters of suspending media capable of improving the physical and biological stability of the aerosol vaccine. Experiments were performed on lyophilized vaccine virus of strain Fc-126 suspended in distilled water, a 10 percent glycerine solution and 5 percent lactalbumin hydrolysate solution in distilled water. The survival rate of the vaccine was found to increase with decreasing temperature from 28 to 20°C and increasing relative humidity of the air from 50 to 98 percent. Addition of glycerine for lactalbumin hydrolysate did not increase the survival rate of the viruses in the aerosol.  
[513-6508]

TRANSMISSIVE SWINE GASTROENTERITIS AND CONTROL MEASURES

Moscow VETERINARIYA in Russian No 2, Feb 84 pp 41-43

KARELIN, A. I., All-Union Experimental Veterinary Institute

[Abstract] The pathogen of transmissible swine enteritis is a coronavirus containing RNA. The mean viral particle diameter is 80-120 nm. The virus is pleomorphic, with fungoid superficial processes producing the characteristic crown shape when seen under electron microscope. The virus can survive for up to 3 years at 20 to 40°C, but is inactivated in 30 minutes at 56°C. It survives pH 3-9. Since there is no specific prophylactic treatment, disease control must be directed toward timely diagnosis and evaluation of farms. The disease strikes piglets early in life, with large percentages of infected animals dying before reaching 10 days of age. General preventive measures are recommended, directed toward prevention of entry of the pathogen into large herds.

[513-6508]

UDC: 619.616.993.192.1-084:636.52/.58

MEANS FOR CONTROL OF POULTRY COCCIDIOSIS

Moscow VETERINARIYA in Russian No 2, Feb 84 pp 44-48

KOZHEMYAKA, N. V., USSR Poultry Industry Commission, KRYLOV, M. V., Zoologic Institute, USSR Academy of Sciences, KRYLOV, V. F., ZAYONTS, V. I., KRYLOVA, N. P., ILYUSHECHKIN, Yu. P. and KIRILLOV, A. I., All-Union Poultry Veterinary Scientific Research Institute

[Abstract] This review of the literature discusses coccidiosis control in both exogenous and endogenous stages, including the use of thiamine pyrophosphokinase inhibitors, dihydrofolate synthetase inhibitors, flavin and cysteine-containing enzyme inhibitors, ornithine decarboxylase inhibitors, nitrogen-base derivatives, monoaminoxidase inhibitors and inhibitors of normal ion transport through biological membranes. The nomenclature, chemical structure, dose and usage directions are presented for each medication. Methods of immunoprophylaxis are briefly discussed. References 9:

4 Russian, 5 Western

[513-6508]

DIAGNOSIS OF MIXED INFECTION IN SWINE PNEUMONIA

Moscow VETERINARIYA in Russian No 2, Feb 84 pp 75-76

SLOBODENYUK, V. K., KUZ'MENKO, D. A., KVASHINA, G. A., TATARCHUK, A. T.  
and PLOTNIKOV, N. P., Sverdlovsk Veterinary Scientific Research Station

[Abstract] Results are presented for studies of materials taken from 35-to-40-day-old swine sacrificed with signs of chronic pneumonia. Blood and pulmonary tissue samples with signs of catarrhal inflammation were studied. Spheroid, thread-like or irregular formations averaging 140-200 mm in diameter were observed under the electron microscope in virtually all tissue specimens. Multilayer membranes indicated that these were microplasmas. Use of the electron microscope and immunoelectron-microscope methods revealed the presence of several pathogens in these cases of chronic pneumonia.

[513-6508]

VARYING SIGNIFICANCE OF EPIZOOTOLOGIC FACTORS IN CONTROL OF FOOT AND MOUTH DISEASE. Brief review.

Bratislava ACTA VIROLOGICA in Russian Vol 27, No 4, Jul 83 (manuscript received 15 Aug 82) pp 370-374

ROHRER, H., East Germany

[Abstract] Foot and mouth disease continues to be an economically important disease of cattle. The discovery of the respiratory path of transition of foot and mouth disease and the significance of airborne aerosols has been significant. The virus-containing aerosols are important not only for direct contact infection, but also as a factor in indirect transmission of the disease. The literature contains no information indicating that the cause for repeated outbreaks of foot and mouth disease during periods free of the infection is cattle persistently carrying the virus. Mechanical transmission of the agent by vectors is the strongest of a variety of connecting links in such cases. References 27 (Western)

[510-6508]

GENETIC VARIABILITY OF INFLUENZA VIRUS DURING ADAPTATION TO NEW HOST

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 5, Feb 84 (manuscript received 12 Aug 83) pp 1217-1220

SHILOV, A. A., RUDNEVA, I. A., OBROSOVA-SEROVA, N. P. and ZHDANOV, V. M., corresponding member, USSR Academy of Medical Sciences, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] Studies were conducted on the genetic variability of the human influenza virus A/USSR/90/77 (H1N1), initially nonpathogenic for mice, in relation to acquisition of pathogenicity for the murine host. After 12 passages in the murine host the virus acquired pathogenicity for the mouse and differed from the parent strain as follows: greater thermostability at 50°C, ability to reproduce at 40°C, and greater hemagglutinin affinity for mice erythrocytes (indicating in viral surface glycoproteins). The pathogenic virus retained these changes during subsequent multiple passages in chick embryos, indicating an alteration in the genome. Nucleotide mapping of the RNA molecules of the parent and mouse-adapted viruses revealed marked differences in the HA and NA genes: 5 incongruent oligonucleotides in the case of HA, and 3 in the case of NA. In addition, two oligonucleotides were incompatible in the case of the NP gene, one oligonucleotide difference was detected in P<sub>1</sub>+P<sub>2</sub> and P<sub>3</sub> genes, while mapping of the M and NS genes revealed no differences in the nucleotide composition. Analysis of the nucleotide sequences thus confirmed the biological observations that only genes coding for surface glycoproteins were involved in the acquisition of virulence for the murine species. Figures 2; references 13:

2 Russian, 11 Western

[571-12172]

STUDY OF PATHOGENESIS OF INFECTION IN SYRIAN HAMSTERS CAUSED BY ATTENUATED STRAINS OF TICK-BORNE ENCEPHALITIS VIRUS COMPLEX

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 83 (manuscript received 29 Mar 83) pp 655-660

VOROB'YEVA, M. S., DZAGUROV, S. G., LADYZHENSKAYA, I. P., GRIGOR'YEVA, L. V. and CHIGIRINSKAYA, A. Ye., State Institute for Standardization and Control of Biological Medication imeni L. A. Tarasevich, USSR Ministry of Health, Moscow

[Abstract] The persistence of flaviviruses and their tie to chronic neuroinfections of the tick-borne encephalitis complex (TEC) are investigated in this study using the example of infections in Syrian hamsters under normal and suppressed immune-response conditions during infection with various degrees of attenuation of the TEC viruses. Three strains of virus, one developed in the USSR and two from Far Eastern sources were administered to Syrian hamsters, some of whom had also received cyclophosphane as an immunity depressant. The accumulation of viruses in blood, brain and extraneural organs was measured from 2 to 104 days after infection. Histological and serological results, as well as clinical symptoms and virological data, show no difference in the central nervous system of mice given the cyclophosphane and those not receiving it. Extraneural infection was without symptoms and caused short-term viremia and insignificant inflammation in the brain of the test animals, with moderate neuron damage. A virus-specific antigen was developed and retained its effectiveness for an extended time. The authors caution that it is essential to differentiate between cuniculosis and viral genesis in studying pathomorphology of central nervous system processes. Strain characteristics were regarded to be a key feature in the course of the experimental infections. Figures 2; references 16: 13 Russian, 3 Western [582-12131]

DETECTING NATURAL HETEROGENEITY OF NATURAL POPULATIONS OF TICK-BORNE ENCEPHALITIS AND GROUPING STRAINS

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 83 (manuscript received 1 Mar 83) pp 706-710

VERETA, L. A., OSTROVSKAYA, O. V., NIKOLAYEVA, S. P. and PUKHOVSKAYA, N. M., Khabarovsk Scientific Research Institute for Epidemiology and Microbiology, RSFSR Ministry of Health

[Abstract] Continuing their previous studies of heterogeneity of tick-borne encephalitis strains in the Amur River basin on the basis of

peripheral activity, infection index, hemagglutinate formation and epidemiological potential, the authors identified adequate genetic markers for detecting such natural heterogeneity. Specimens of *Ixodes persulcatus* collected in 1976-1981 provided the pathogen; they were collected in the conifer and broad leaf forests of Khabarovsk Kray and Sakhalin island. Assessment methods are summarized. For the test white mice, the strains fell into categories of high neurovirulence, high brain and relatively low virulence for the peripheral nervous system, low virulence and virulence that was greater for the peripheral nervous system than for the brain. The course of the disease for various strains is summarized. The strains also varied in sensitivity to detergents such as "giamine 10 X," "triton X-100" and "tween-80." Ion-exchange chromatography showed that the fractioning of hemagglutinates and their absorption of the DEAE-sephadex A-50 text material correlated to a given strain's pathogenicity. Variations in strain characteristics are judged to be related to ecological factors, which were not covered by the present study. References 20: 16 Russian, 4 Western  
[582-12131]

UDC 578.833.29.082.5

#### CONDITIONS FOR PRESERVING BUNYA VIRUSES OF SIMBU GROUP

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 83 (manuscript received 13 Jul 82) pp 752-755

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[Abstract] While most viruses can be preserved in a frozen state for prolonged periods, no data on such procedures has been reported for the Simbu group of Bunya virus family. The present article reports on test procedures that would permit drying and prolonged preservation. After passification in suckling mouse brains, the virus-containing suspension of brain tissue was subjected to lyophilization, then dried with saccharose and gelatin, nonfat dry milk, peptone, beef albumin, sorbite and gelatose, or no filler. Data on loss of infectious activity after drying and after storage indicate that with freezing, prolonged storage (for 3 months) had the best success with beef albumin as the filler, and the worst results without any filler. Optimum storage temperature was 4°C, and 36°C was lethal for all viruses of the group within 3 months regardless of the filler used. References 3 (Russian)  
[582-12131]

## POPULATION AND MOLECULAR-BIOLOGICAL MECHANISMS OF VIRUS PERSISTENCE

[Editorial]

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[Abstract] This note discusses persistent viral infections that have interested scientists in recent years. Variations in morphology and spread of infected cells, effects of antiserum and defective interfering viral particles have received special attention. Studies of host cells and analysis of the structure of persistent heterogeneous virus populations have been studied using methods of molecular biology. Studies of RNA and DNA of tick-borne encephalitis are leading to synthesis and replication for further laboratory study. Several remaining areas for research in sources, mutations and gene taxonomy are suggested.

[582-12131]

## STRUCTURAL ANALYSIS OF AVIAN MYELOBLASTOSIS VIRUS RNA SUBUNITS

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[Abstract] Detailed electron microscope and sedimentation studies of the splitting of 35S RNA of the avian myeloblastosis associated virus and topographic determination of sectors in which RNA degradation primarily occurs were undertaken. The RNA fragments were studied for their ability to code the synthesis of protein. All experiments utilized avian myeloblastosis associated virus strain A, isolated from the blood of chicks with leucosis, taken in the terminal stages of myeloblastosis. The total viral RNA was extracted with a mixture of phenol and sodium dodecylsulfate. 35 S RNA was treated with a mixture of 78 percent formamide in 3.9 mol/l urea at 53°C for 35 seconds, cooled in ice and diluted with TN buffer (pH 8.5). The RNA dissolved in the TN buffer at pH 8.5 was stained with uranyl acetate, dewatered in alcohol and a platinum-palladium alloy atomized in a rotation installation at an angle of 7°. Electron microscope studies were performed. The electron microscope studies revealed an unusually large number of molecules of different sizes, all smaller than the 35 S subunits. The molecules were fractions of the viral genome which could develop as a result of degradation. The results of electron microscope, sedimentation and electrophoretic analyses confirmed the electron microscope data of earlier works with respect to nonrandom degradation of the RNA genome and indicate the presence of four sectors in the genome where splitting primarily occurs. Significant differences in the sensitivity of these sectors to splitting were determined. Figures 7; references 29 (Russian)

[510-6508]

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